Vol. 8, No. 10

OCTOBER, 1953

AGRICULTURAL CHEMICALS

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The Future for Fungicides

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•

National Fertilizer Assn. to Atlanta

•

Fertilizer Supply Situation Reviewed

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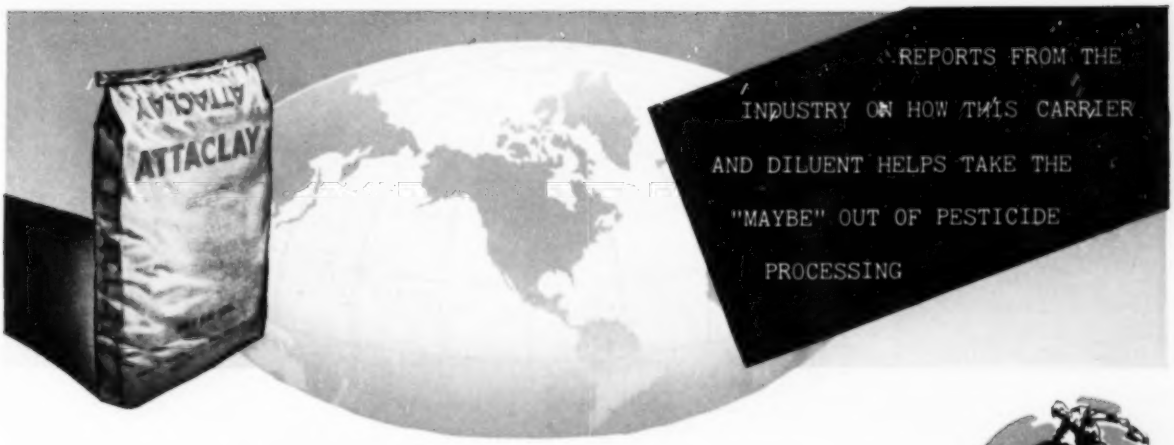

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LOCATION: Texas

OPERATION: Cotton Dust Base Manufacturing

OWNER: *Here in our plant we have another name for Attaclay's conditioning ability—we call it "built-in quality control." Our dusts are dry and loose when made—and stay that way until used. There's always a market for premium products.*

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OPERATION: Finished Dust Blending

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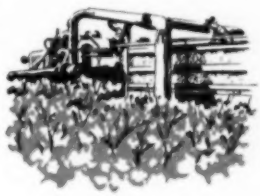

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AGRICULTURAL CHEMICALS

This Month's Cover

Paul Mayfield, newly-elected president of the National Agricultural Chemicals Association, is General Manager of the Naval Stores Department of Hercules Powder Company, Wilmington, Delaware. President Mayfield has long been active in the affairs of both the Association and of the industry at large. (Complete report of NAC Association meeting begins on page 32, this issue).

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A Monthly Magazine For the Trade

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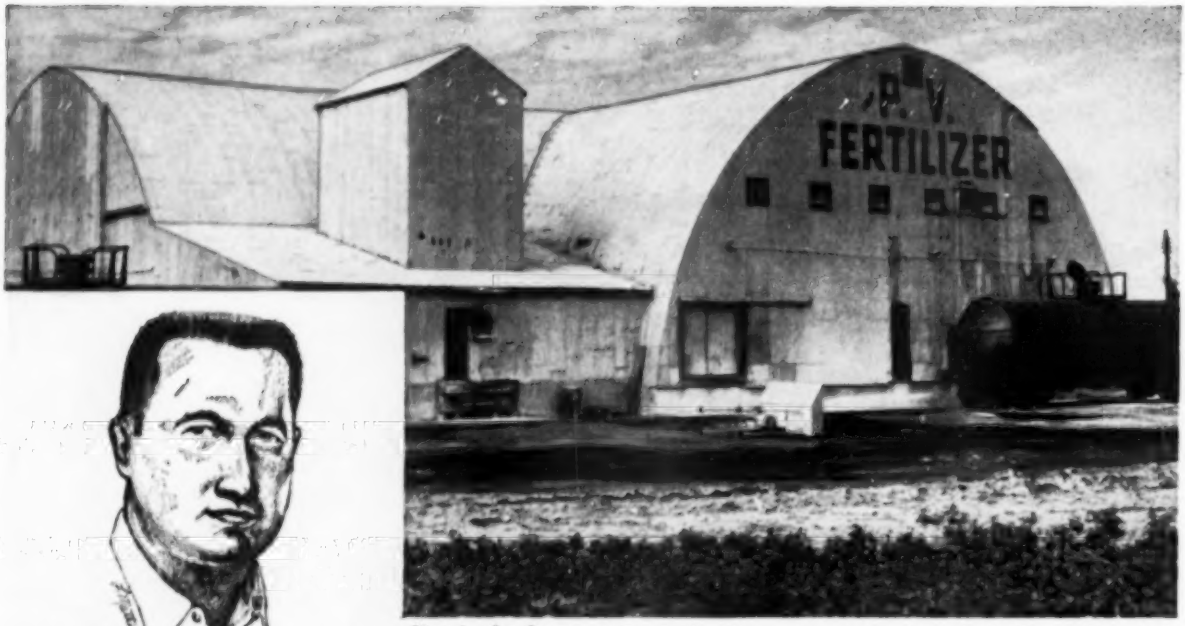

President of Curry Chemical Company is W. A. Curry, who organized the firm in 1948.

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- ☐ Manufacturer

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- ☐ Candy
- ☐ Dairy Plants
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- ☐ Food Plants
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- ☐ Grain Elevators
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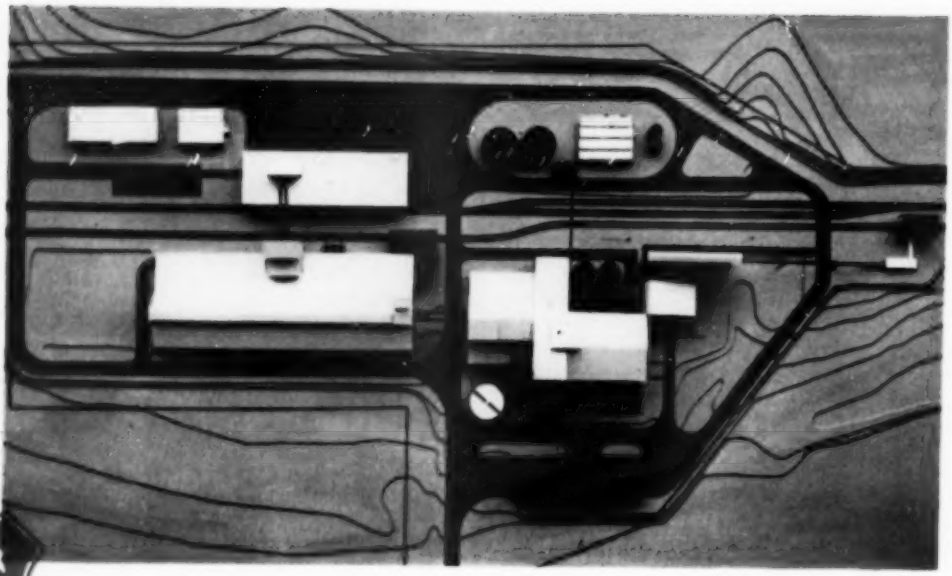

Model of the Missouri Farmers Association chemical fertilizer plant, scheduled for initial operation in the summer of 1954. The Dorr Company's Consulting Engineering Department is responsible for the complete design of the 75 ton P_2O_5 per day plant which will be located near Joplin, Mo.

M·F·A

to produce concentrated phosphoric acid and complete granular fertilizers with DORR-DESIGNED PLANT

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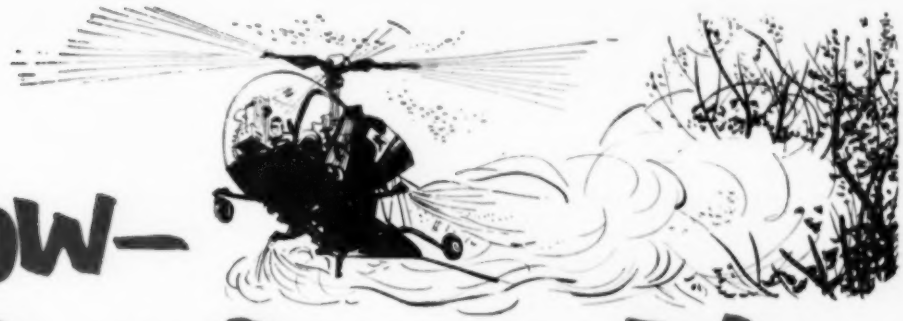

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As a solvent, vehicle and synergist for oil-soluble insecticides and fungicides.

As a vehicle for pesticides used in low-volume spray equipment, such as planes, helicopters, hand sprays.

As a vehicle for application of nutrients, plant hormones, plant regulators, systemic insecticides and fungicides, defoliants.

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As a carrier for oil-soluble organo-metallic fungicides.

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3. **LONGER LIFE STANDS**—vigorous growth shades out weeds.

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—by Royer & Roger, Inc., leading industrial designers, yours exclusively from Hudson.

TIME-MOTION SERVICE
—Movies of your packing operation for efficiency study.

SPECIAL SERVICES
—on delivery, storage and inventory control problems.

"PROBLEM PRODUCT" PACKAGING
—specialists to study your requirements.

In many a championship match, after more than 140 equal strokes, the winner is decided by a margin from lip to cup — enough to make the difference.

With multiwall sacks, too, strong contenders are matched to supply your needs. Yet there are differences between their services and their sacks which, taken individually, may be small. But over the whole course they can save you strokes — enough to make the difference.

If you haven't checked on your packing and shipping recently, do so now when the squeeze is on your profits between rising costs and lower selling prices. You will find the extra points which Hudson can give you make tangible savings — enough to make the difference.

HERE'S ONE EXTRA POINT FOR YOUR PRODUCT'S SALES APPEAL

...*Hudson's Modern Sack Printing Plant*

Sharp, forceful presentation of your product identification and selling message on the multiwall sack makes a difference in the display values and sales appeal of your product. Hudson's sack printing plant, most modern in the industry, can make the difference in your product's appearance.

If your present sack design puts you at a competitive disadvantage, a new one can be developed for you by Royer & Roger, Inc., the industrial design organization whose exclusive services Hudson makes available to you without charge.

For full information, send the coupon below today.

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YES! We'd like further information on Hudson's modern printing plant and the sack design services of Royer & Roger, Inc.

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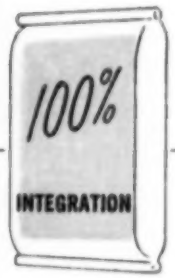
Is a 100-100-100 formula... *impossible?*



Such a mix is fantastic for fertilizer but a 100% formula is possible when you are talking about multiwall sacks for the fertilizer industry.

Hudson's 100% *integration* – from seedling to sack – means a more uniform multiwall sack. The 100% completely *modern production line* and the 100% checking and *inspection program* assures you that Hudson Multiwall Sacks are uniform, strong and resistant to damage. It's *enough to make the difference!*

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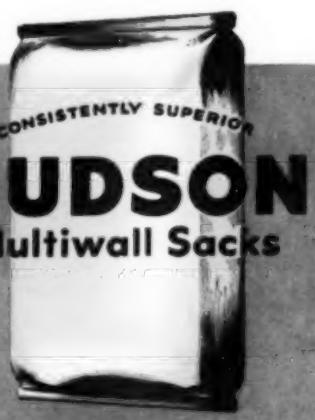
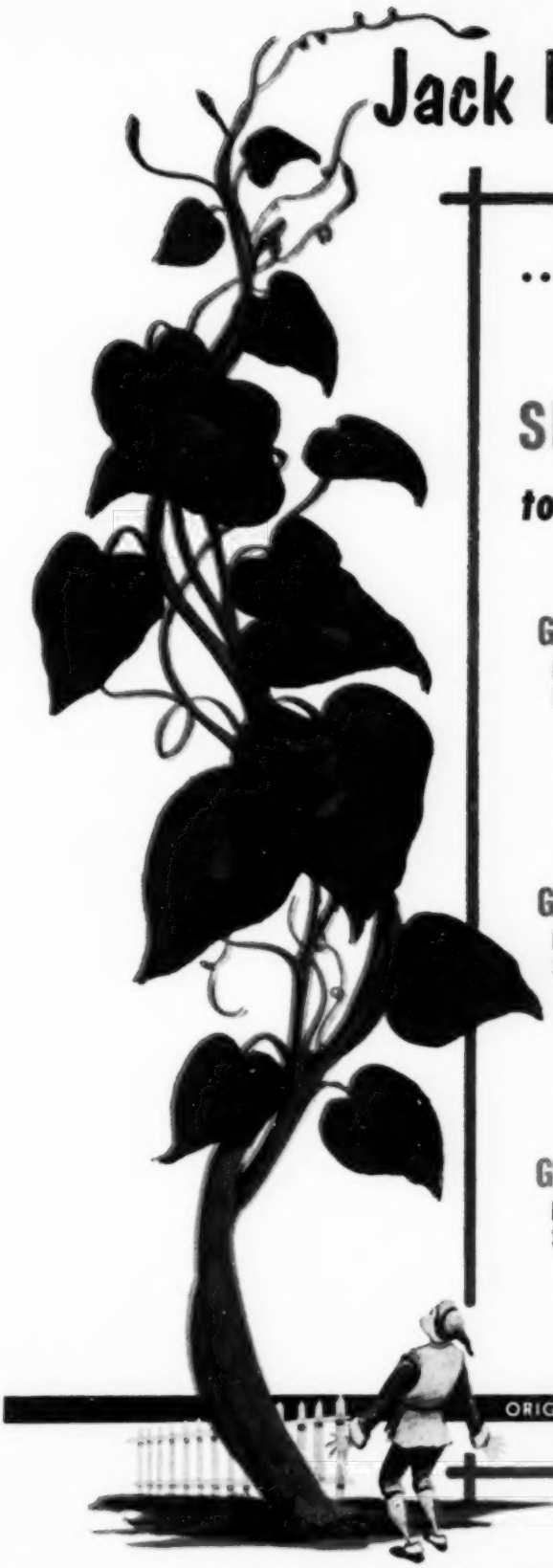
Hudson offers you 100% service on *delivery schedules* – the integrated operations gives assurance that supplies are always available – as well as storage and inventory control problems. Specially trained *specialists* are available to you to help you solve *"problem product" packaging* and to help you iron out any bottlenecks in your packaging process. It's *enough to make the difference!*



Check over this list of 100% services that Hudson Multiwall Sacks offer you.

Mail the coupon on the other side of this page for complete information.

Jack had his beanstalk...



...but today farmers have GEIGY SEED PROTECTANTS to insure tall, sturdy crops!

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FOR ALFALFA AND SMALL SEED LEGUMES, BEANS, PEAS, VETCH, FLAX

This new Geigy product reduces the risk of decay and "damping-off" and permits earlier planting even during damp spring weather. GEIGY SP-50 is a dry wettable powder containing 48% chloranil and may be used with or without water.

GY-TRETE

FOR WHEAT, BARLEY, OATS, FLAX, SORGHUM, COTTON

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GEIGY LINDANE "25W"

FOR CORN, BEANS, PEAS, COTTON, SUGAR BEETS

This 25% lindane wettable powder protects seeds against wireworms. It may be dusted directly on seed or mixed with seed in a seed treating box.

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Top-grade bagging materials plus expert designing and careful construction, give V-C Multiwall Bags the ability to stand rough, tough treatment in handling, in shipping and in storage.

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2 TO 6 PLY

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construction and performance, get the
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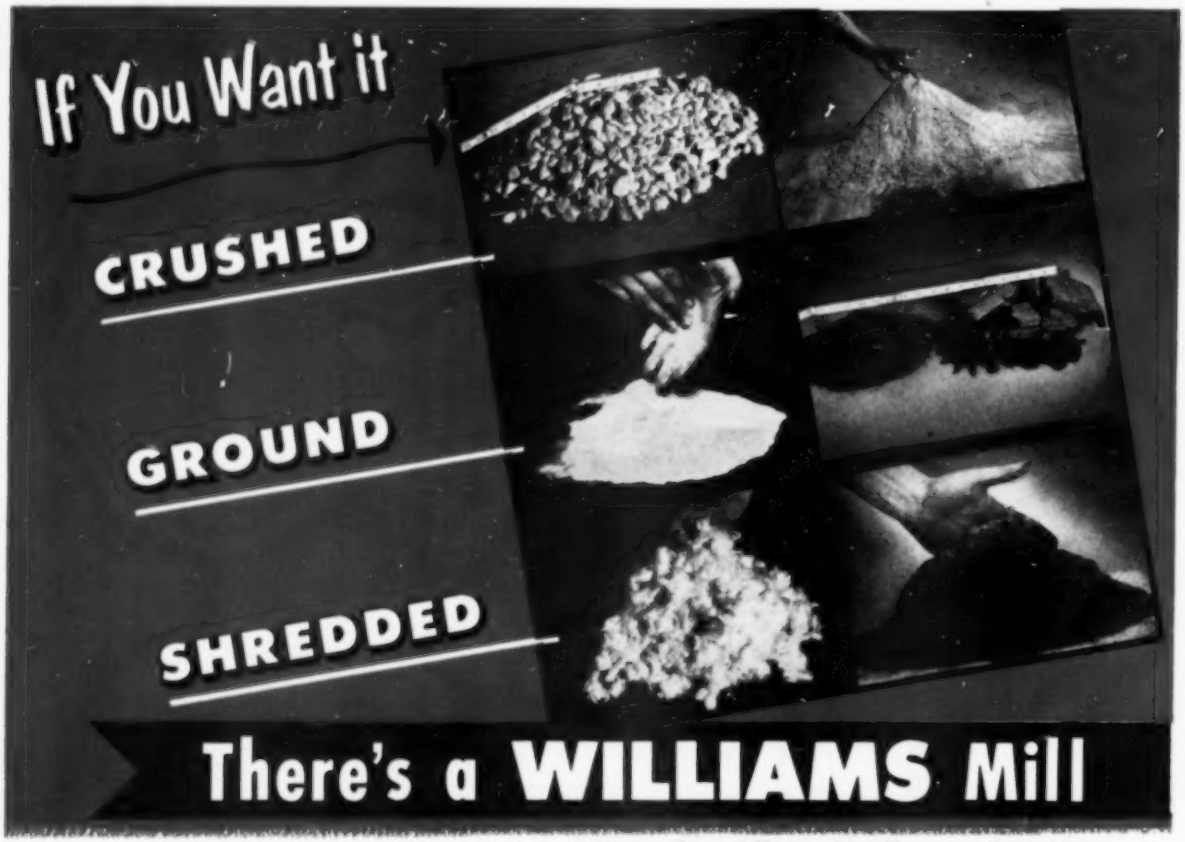

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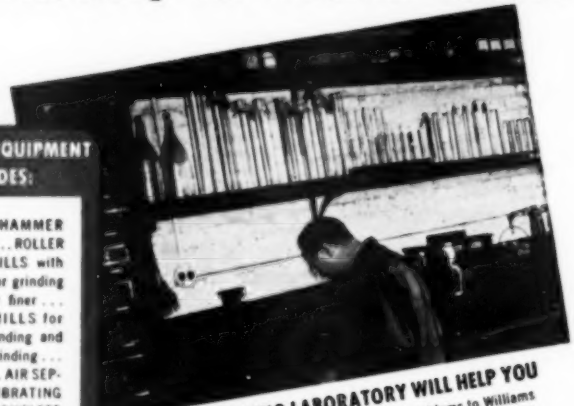

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Submit your grinding, crushing or shredding problems to Williams for solution—with neither obligation or cost. Simply send enough raw material for a test, and describe the result you want.

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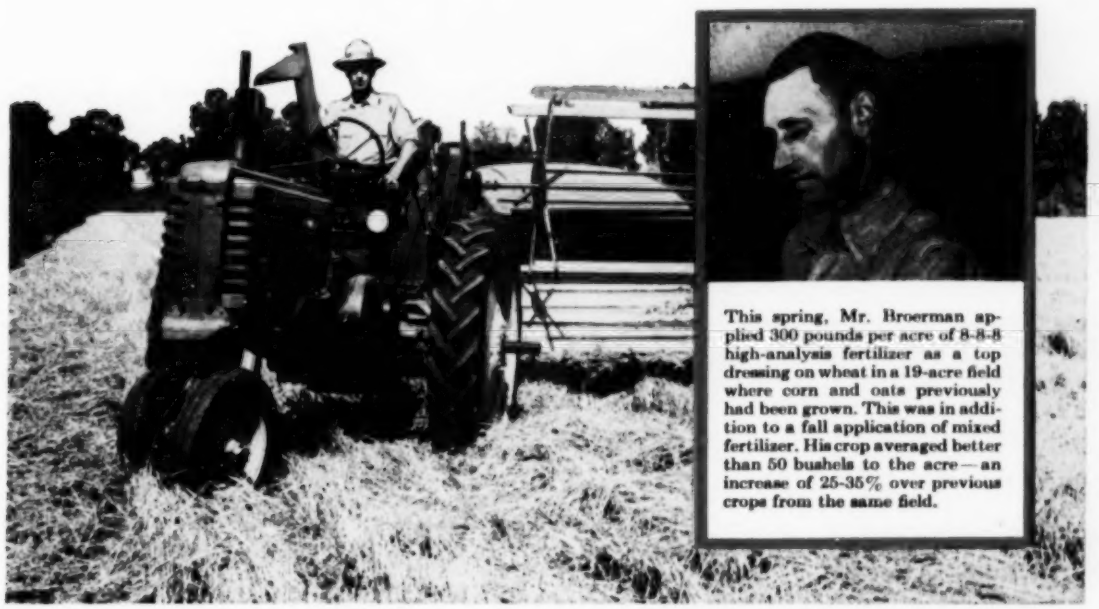
CRUSHERS GRINDERS SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

Spring top dressing of 8-8-8 helps increase wheat yield 25-35% for Julius Broerman, St. Marys, Ohio



This spring, Mr. Broerman applied 300 pounds per acre of 8-8-8 high-analysis fertilizer as a top dressing on wheat in a 19-acre field where corn and oats previously had been grown. This was in addition to a fall application of mixed fertilizer. His crop averaged better than 50 bushels to the acre—an increase of 25-35% over previous crops from the same field.

▶ Be sure your dealers will be supplied with good stocks of 8-8-8 and 10-10-10 for early spring sales! ◀

DEMAND for high nitrogen fertilizers is increasing all over the country as more men like Mr. Broerman actually see for themselves the increased yields that result from its use. Make certain that your dealers will have enough 8-8-8 and 10-10-10 on hand to be able to benefit from the early spring demand.

U·S·S Ammonium Sulphate can help you keep this demand on the increase by giving you top-quality nitrogen content in your complete fertilizers. Since U·S·S Ammonium Sulphate is a dry, free-running substance, it is easier to mix and easier to handle in distributing equipment. And it's thoroughly reliable in storage.

For complete information on U·S·S Ammonium Sulphate—either in bulk for mixing in your high-nitrogen fertilizers or bagged for direct application—contact our nearest Coal Chemical sales office or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

Bigger yields for farmers mean better business for you

U·S·S AMMONIUM SULPHATE

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UNITED STATES STEEL

INDUSTRY MEETING CALENDAR

Association of American Fertilizer Control Officials, Shoreham Hotel, Washington, D. C., October 16.

Association of Economic Poisons Control Officials, Shoreham Hotel, Washington, D. C., October 17.

Entomological Society of British Columbia and Entomological Society of Canada, Empress Hotel, Victoria, B. C., Oct. 19-21.

First International Congress for Plant Protection, University of Naples, Portici, October 19-23.

Fertilizer School, University of Arkansas, Fayetteville, Ark., October 19-23.

New England Fertilizer Conference for 1953, The Norwich Inn, Norwich, Conn., October 20 & 21.

Fertilizer Safety Section, National Safety Council, Chicago, Ill., October 21.

Seventh National Garden Supply Trade Show & Merchandising Clinic, Municipal Auditorium, Long Beach, Calif., Oct. 27-29.

Second Annual Meeting of the Entomological Society of Canada jointly with the Entomological Society of Quebec, Quebec City, Oct. 29-31.

Pacific Northwest Plant Food Association, Harrison Hot Springs, British Columbia, Nov. 4-5.

Thirtieth Annual Convention, California Fertilizer Association, Carmel-By-The-Sea, Calif., November 9 & 10.

Sixth Annual Pesticide Application Equipment Conference jointly with 15th Annual New York State Insecticide-Fungicide Conference, Bibbins Hall, CLF, Ithaca, N. Y., November 10-12.

National Fertilizer Association, annual fall meeting, Biltmore Hotel, Atlanta, Ga., November 16-18.

Annual Meetings of American Society of Agronomy and the Soil Science Society of America, Dallas, Texas, Nov. 16-20.

Chemical Specialties Manufacturers' Association, Inc., 40th annual meeting, Mayflower Hotel, Washington, D. C., December 6-8.

Twenty-Second annual meeting, California Mosquito Control Assn., Inc., Claremont Hotel, Berkeley, Calif., December 2-4.

National and North Central Weed Control Conferences, Hotel Muehlebach, Kansas City, Mo., December 8-10.

Entomological Society of America, Biltmore Hotel, Los Angeles, Calif., December 7-10.

Seventh Southern Weed Conference, Hotel Peabody, Memphis, Tenn., January 11-13.

Illinois Custom Spray Operators' Training School, University of Illinois, Urbana, January 21-22, 1954.

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DIAMOND'S facilities for manufacturing and distributing agricultural chemicals for weed control, brush control and insect control assure formulator of pesticides a *dependable* source of supply for these important materials.

DIAMOND ALKALI COMPANY, long associated with high quality chemicals, is one of the world's largest manufacturers of basic herbicides and insecticides. The name DIAMOND itself is your automatic assurance of the best the market has to offer. Write for literature — and use our technical consulting service for your special problem. Your inquiries are welcome.

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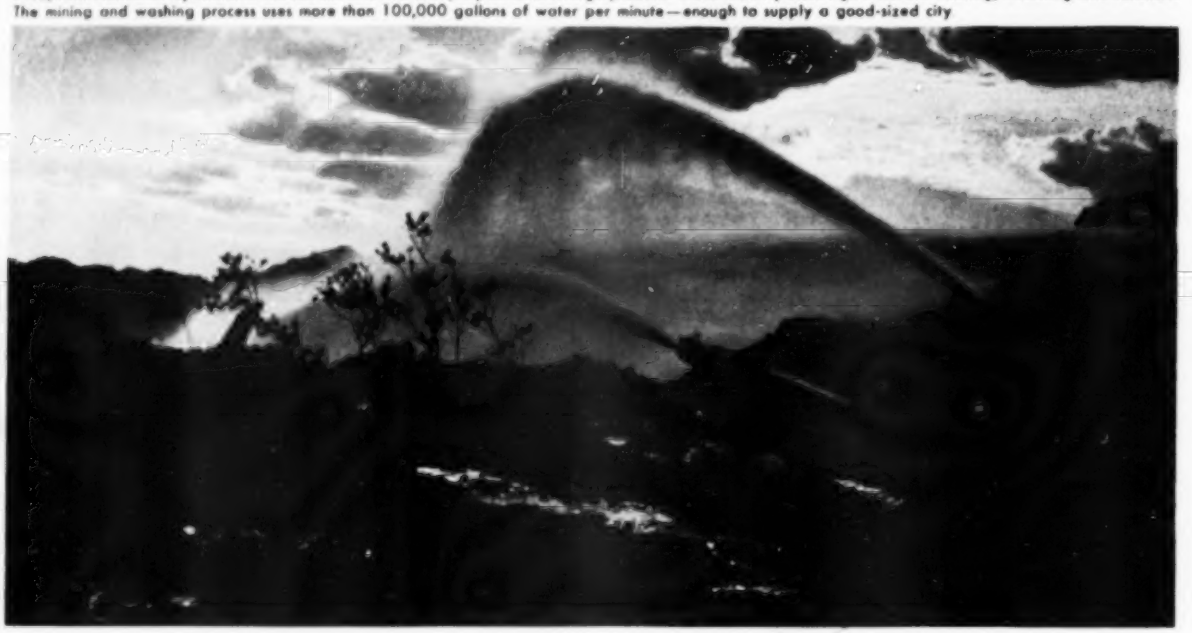

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You can count on American Cyanamid as a prime source of supply for phosphate rock, available in many grades to suit your requirements. You can count on Cyanamid's expert technical service, too, for assistance with acidulation problems.

Washed and Dried Florida Pebble Phosphate Rock is available in bulk in the following grades, based on content of bone phosphate of lime (BPL): 77/76%, 75/74%, 72/70% and 68/66%.

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Screened Phosphate Rock (Industrial Grade). For use in electric furnaces producing elemental phosphorus, phosphoric acid and numerous other phosphatic compounds.

Write for Free Table prepared by American Cyanamid Company for calculating acidulating formulas. Shows at a glance, in simple and concise form, how to prepare the strength of acid desired.

AERO-PHOS®

Florida Natural Phosphate

Recommended for use where it is desirable to apply phosphate directly to the soil as a soil-improvement measure. AERO-PHOS is an extremely fine-ground, high-grade phosphate, with either 31% or 33% P_2O_5, available in bulk and in bags. AERO-PHOS should be used to supplement mixed goods or superphosphates and is not recommended as a substitute.

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POTASSIUM CYANATE Weedkiller for Agriculture and Turf
AEROTIL® Soil Conditioners

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Editorial
COMMENTS

NEED for a greater, rather than a lesser percentage of return on the sales dollar is one of the greatest factors involved in the present sad state in which the pesticide industry finds itself. In his recent address before the National Agricultural Chemicals Association at Spring Lake, Arthur W. Mohr, retiring president, said that the dollar return on sales is lower in the pesticide industry than it is in the chemical industry as a whole.

This certainly should not be, since the pesticide trade has problems not encountered in other business. Large inventory requirements in relation to sales; the seasonal aspect of the business; and the inability of the industry to promote early buying of seasonal needs all add up to an unfavorable balance.

Just how these obstacles may be overcome is really a tough question. As Mr. Mohr pointed out, "Labor and salaries are up; raw materials are up; freight rates are higher, taxes are higher and there has been an increase in practically every miscellaneous cost of business." These pressures squeezing against lowering prices, make for real discomfort in the industry.

This is not the first time the trade has faced hardship. The men who have been through the past years of over-supply, under-supply, shortages, and periods of low demand, have emerged a hardy race of business men. Having learned the hazards peculiar to the business, they look ahead to a better break next year.

Better sales techniques, better merchandising methods, and improved products all enter into the picture; but perhaps the most important objective of the industry is that of seeking new users for pesticides. One conspicuous example is that of promoting the expanded use of grain insect control in local elevators as well as in railway cars, storage bins, etc. The final sales potential for pesticidal products has not been reached by any means. It remains for industry leaders to exercise imagination and boldness in discovering areas where use of insecticides, fungicides, rodenticides and weed killers might be either introduced or expanded.

As things stood last season, orders were obtained largely on the basis of cutting prices, which got progressively worse until no one made any money. Is this because everyone is trying to sell only the existing known markets? We think this is partly responsible. Perhaps the way to lick the problem is for someone to dig out some brand new ideas. The discoverer thus gains a distinct advantage and eventually broadens the field for all.

REDUCTION in both the frequency and severity of accidents in fertilizer plants is almost sure to be achieved with the entire industry working toward that end. Results of the past year's safety efforts in plants across the country will be learned at the October meeting of the Fertilizer Section of the National Safety Council in Chicago. Reports will be heard on accidents of the past with recommendations for avoiding recurrences of the same.

It is not pleasant to face unflattering statistics but the fertilizer industry is doing it and in so-doing, the record of future years is bound to be much improved.

"Poor Season" is Reviewed at Spring Lake, N. J. as the

NAC Meets

PAUL Mayfield, general manager of the Naval Stores Department of Hercules Powder Co., Wilmington, Del., was named president of the National Agricultural Chemicals Association at the group's 20th annual meeting at Spring Lake, N. J., September 9-11. Mr. Mayfield, elected to serve a two-year term, succeeds Arthur W. Mohr, president, California Spray-Chemical Corp., Richmond, California.

Succeeding Mr. Mayfield as vice-president of the Association, is W. W. Allen, Dow Chemical Co., Midland, Michigan. Mr. Allen has been a member of the NAC board of directors for a number of years.

The meeting, attended by a record-breaking group representing every phase of the industry, featured talks by leaders in industry, Government officials and a panel discussing prob-

In the Photos

L to R: (top photo) Hon. J. Earl Coke, Assistant Secretary of Agriculture, Washington, D. C.; NAC president, A. W. Mohr; Dr. F. C. Bishopp, Oscar Johnson Cotton Foundation, Memphis, Tenn.; and Lea S. Hitchner, NAC Executive Secretary.

Second picture: H. A. Hashbarger and C. P. Zorsch, Monsanto Chemical Co., St. Louis, Mo.; E. W. Cannon, California Spray-Chemical Corp., Richmond, Calif.; and J. S. Coey, Hooker Electrochemical Co., Niagara Falls, N. Y.

Right: Newly elected NAC president, Paul Mayfield, (L) receives hearty congratulations and best wishes from his predecessor, Arthur W. Mohr at annual banquet of the Association.

lems involving mixtures of pesticides with fertilizer materials.

In his farewell address, president Mohr reviewed the 1953 season, pointing out that although volume sales were good, an unsatisfactory price structure had left the trade with very little profit. He displayed two charts showing, first, the price fluctuation of pesticides from 1948 to 1953, inclusive; and second, the relation of inventory to annual net sales dollars over the period of from 1947 to 1952. In the latter, comparison was made between the pesticide industry and the chemical industry, with the pesticide industry showing a 26.3% inventory average against a 15% average for the chemical industry as a whole.

One important reason for the 1953 squeeze, Mr. Mohr said, is that of higher operating costs than obtained in earlier periods. "Labor and

Pres. Mohr Presents Charts

Photos at Right

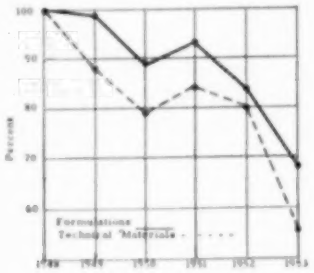
Top photo: Dirck Reichard, Stauffer Chemical Co., New York; Jack Vernon, Niagara Chemical Division, Food Machinery & Chemical Corp., Middleport, N. Y.; and Melvin Goldberg, New York.

Middle photo: B. C. Dickinson, U.S. Industrial Chemicals, Baltimore, Md.; Marshall M. Manns, and Alfred G. Raufer, both of Michigan Chemical Corp., Saint Louis, Michigan; and Lawrence McAlister, United Cooperatives, Philadelphia.

Lower picture: W. R. Allstetter, vice-president, National Fertilizer Association, Washington, D. C.; and Rodney C. Berry, Virginia State Chemist, Richmond, Va.

Chart One

Pesticide Price Fluctuation Year averages of 9 technicals & Typical formulations are shown as percent of 1948 average.

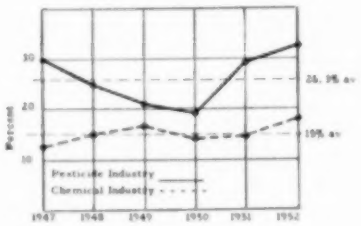


Technical materials include DDT, BHC, Lindane, Aldrin, Chlordane, Toxaphene, Parathion, TEPP and 2,4-D Acid.

Formulations include DDT 50W, BHC 10W, Chlordane 40W, Lindane 25W, Aldrin EQ-2#, Toxaphene 20D, 2,4-D Amine and Parathion 15W.

Chart Two

Inventory Relation to Annual Net Sales Dollar Expressed in Percent.



Charts presented by Pres. Mohr

Top row (L to R): Louis Lykken, Julius Hyman Division, Shell Chemical Corp., Denver, Colorado; Dr. P. D. Peterson, Stauffer Chemical Co., Apopka, Fla.; Dr. T. W. Brasfield, Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn.; Dr. H. G. Johnston, National Cotton Council, Memphis, Tenn.; and Dr. H. Douglas Tate, Naugatuck Div.

Second row: D. H. Braffield, Mid-South Chemical Co.; Jack Miller, Atlas Powder Co., Wilmington, Del.; Eugene D. Witman, Columbia-Southern Chemical Corp., Pittsburgh; and L. G. Parkinson, Atlas Powder Co.

Third row: Dr. Bruce Gleissner, American Cyanamid Co., New York; Al Connley, General Chemical Co., New York; Jack Moore, Floridin Co.; and Dr. J. B. Skaptason, Pittsburgh.

Fourth row: A. Petrus, Cotton States Chemical Co., West Monroe, La.; Jack Brunton, Diamond Alkali Co., Newark, N. J.; and George F. (Grub) Leonard, Tobacco By-Products & Chemical Corp., Richmond, Va.

Fifth row: Members of Fertilizer-Pesticide Mixtures panel outside the Monmouth just before program. (L to R): Rodney C. Berry; Charles P. Harding, Virginia-Carolina Chemical Corp., Richmond, Va.; Dr. C. C. Compton, Julius Hyman Div., Shell Chemical Corp., Denver, Colo.; Eugene Ordas, Velsicol Corp., Chicago, Ill.; Dr. L. Gordon Utter, Diamond Alkali Co., Newark, N. J.; and Dr. M. D. Farrar, Clemson Agricultural College, Clemson, S. C.

Lower row (L): President Mohr presents to Lea S. Hitchner award on behalf of Association in recognition of the secretary's twenty years' service in the Association.

Bottom of page: NAC board members and June Heitzman, former Association secretary, at banquet. Top row: W. C. Bennett, Phelps-Dodge Refining Corp., New York; president Paul Mayfield; Frank Maughan, Rohm & Haas Co., Philadelphia; retiring president Mohr; W. W. Allen, Dow Chemical Co., Midland, Mich., vice-president; L. S. Hitchner, executive secretary & treasurer; G. F. Leonard; Ernest Hart, vice-president,, Food Machinery & Chemical Corp., New York; G. C. Romig, president, American Chemical Paint Co., Ambler, Pa., newly-elected board member; and John H. Kennedy, Stauffer Chemical Co., New York, also new member of board.

Middle row: A. Petrus; Russell Stoddard, U. S. Industrial Chemicals Corp., New York; I. M. Taylor, Taylor Chemical Co., Aberdeen, N. C.; Miss Heitzman; James McConnon, McConnon & Co., Winona, Minn.; and Frank L. Holland, Winter Haven, Fla.

Lower row: Ed. Phillips, Cooperative GLF, New York; George T. Larrick, FDA, Washington, D. C.; T. L. Wilkerson, American Cyanamid Co., New York; Dr. M. D. Farrar; and Dr. L. Gordon Utter.

Photos this page:

Top picture: The Fertilizer-Pesticidecide panel ready to discuss the question of the day. Left to right: C. P. Harding, Gene Ordas, L. G. Utter, Rodney C. Berry, C. C. Compton and M. D. Farrar.

Second row: Golf foursome in tourney: Ed. Phillips; Russell Stoddard; Joseph Hoeffler; and W. P. Marsh, Jr., pres., U. S. Industrial Chemicals Div.

Lower three pictures: Various groups at banquet. Included in third picture are Val Weyl, NAC Association; Dr. W. E. Dove, U. S. I. Chemicals, Baltimore; Mr. & Mrs. J. M. Merritt, Tobacco By-Products; & Chemical Corp., Richmond, Va.; John Long, Tobacco By-Products; Mrs. Russell Stoddard; and Marie Shimberg, NAC staff.

Fourth picture: group from Pennsylvania Salt Mfg. Co. L. to R.: F. L. Lucard; Charles G. Whinfrey; Donald E. Hope; Kenneth K. Krausche; Mrs. Lucard; Arthur F. Bixby; Cameron Siddall; and Nick M. Walker.

Bottom photo: William Merritt, H. J. Baker & Bro., New York; Mrs. Jack Hewitt; Ted Plant, Columbia-Southern Chemical Corp., Pittsburgh, Pa.; Mrs. Merritt; Jack Hewitt; Mrs. Plant; and Bill Newton, Columbia-Southern.

salaries are up substantially, raw materials are up rather than down, freight rates are higher, taxes are higher and there has been an increase in practically every miscellaneous cost of business. It is therefore thoroughly understandable with increased costs and decreased selling prices, that profits have vanished", he said.

Mr. Mohr added that "This is a rather sorry picture and in sharp contrast to the chemical industry as a whole." The pesticide industry has problems not encountered in the chemical business, which in itself should command a greater, rather than a lesser percentage of return on the sales dollar, he pointed out. Among these factors is the large inventory requirement in relation to sales. The seasonal aspect of the business complicates it; there is no advance buying now with over-production with us.

Other problems complicating the picture are those of product liability, credit, and consignment shipments. All of these factors point up the need for a greater return on the sales dollar to help compensate for the risk involved.

A pessimistic picture was drawn regarding prospects for the industry's success in 1954. "All indications point to acreage allotments

on certain crops for next year and a consequent shrink in our market potential," he said. At the same time, he noted, there is no move to cut the productive capacity of the industry, which may aggravate, rather than relieve, the over-supply situation. Export possibilities for 1954 are also shrinking as European production has increased and as fewer dollars are available in the foreign market.

"Looking ahead over a longer period", he said, "there is little chance of betterment until some of the excess manufacturing capacity is converted to the manufacture of other chemicals with a better profit potential, to such an extent that supply and demand come into reasonable balance. He added that this will probably come about after a sufficient amount of red ink has been posted on company books. It is not easy to state just when this may come about, the president declared, but the prospect makes it difficult to view the coming season with any great degree of optimism.

Hitchner Reports

EXECUTIVE secretary Lea S. Hitchner reminisced on his associations with the group over the past twenty years, utilizing the experiences of the past to point out prospects for the future. He noted

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Photos this page:

Top Row: L to R: Dr. F. C. Bishopp, Oscar Johnson Cotton Foundation, Memphis, Tenn. with former associates of U.S.D.A., J. Earl Coke, Assistant Secretary of Agriculture; Drs. E. F. Knipling and H. L. Haller, assistant chiefs, B.E.P.Q., Washington, D. C.

Second row: (Seated) Ivor R. Burden, United Chemical Co., Richmond, Calif.; Melvin Goldberg, Pesticide Advisory Service, New York; and Jack Hewitt, Lebanon Chemical Co., Lebanon, Pa.

(Standing) H. F. Seeland, S. B. Penick & Co., New York; George I. Purvis, Standard Agricultural Chemicals, Inc., Hoboken, N. J.; Ray F. Byrnes, Rohm & Haas Co., Philadelphia; Jack Brunton, Diamond Alkali Co., Newark, N. J.; and Clay Brazeal, Hayes-Sammons Co., Mission, Texas.

Third row: Dr. J. B. Skaptason, Pittsburgh Agricultural Chemical Co., Pittsburgh; and William K. Feustel, R. T. Vanderbilt Co., New York.

Bottom Row: J. H. Buckholtz, United Cooperatives, Baltimore, Md.; Mercer Rowe, Ashcraft-Wilkinson Co., Atlanta, Ga. and Bill Newton, Columbia-Southern Chemical Co., Pittsburgh, Pa.

that many of the prominent firms in the pesticide industry today were active when the Association began in 1933; and that the leadership which solved problems facing the industry then, will also overcome the obstacles standing in its way today.

LEA S. HITCHNER

Economic and public relations problems have changed but little in the industry, Mr. Hitchner said, except that they have multiplied in size and importance with the growth of the industry. "In the 20's," he recalled, the public relations problem of white arsenicals and the problem of seed-treating chemicals' becoming incorporated in flour presented a health problem. Today, we have the residue problem, which was also a problem in the 20's. The same is true of distribution which is going through the same channels with the same problems, only multiplied in dollars."

The NAC secretary declared that through sound public relations and education, a better atmosphere may be created in which the various competitive factors can operate in accordance with the principles of free enterprise.

That legislation, both on the federal and state levels, is being introduced in great quantity was pointed out by Mr. Hitchner who reported that more than 250 bills related to the industry were up for consideration during the past year. Much of this legislation is the result of public fear created by magazine articles, books and newspaper stories of exaggerated nature, published within the past year or so.

Another problem of serious nature is that of the confused economic status of the industry. Falling markets have destroyed the "buy early" program which had been functioning with some success for the past several years. Excessive plant capacity for many products, plus inventory and warehouse problems at all levels of distribution, and credit problems, all combine to complicate the economics involved. Members of the industry are obliged to act not

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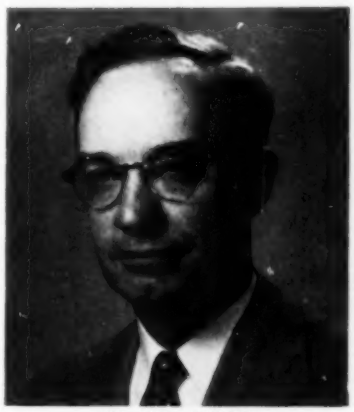
New NAC Vice-President with Dow 22 Yrs.



Wm. W. ALLEN

NAC Association's newly-elected vice-president, William W. Allen, is manager of Agricultural Chemicals sales for Dow Chemical Co., Midland, Michigan. He has been with the company since 1931 at which time he was a research chemist in the Organic Research Laboratory. He served here until 1934, then engaged in special product sales for three years, later devoting his efforts to technical service activities in connection with agricultural chemicals, until 1941. He then joined the company's technical service and development section, becoming assistant manager in 1943 and manager two years later.

Appointed to his present post as manager of Agricultural Chemicals in 1948, Mr. Allen was named secretary of Dow's Agricultural Chemical Executive Committee in 1951. Several patents in the agricultural chemical and allied fields have been issued under his name.

The NAC Association vice-president is a native of Wisconsin, and received his B.S. degree in chemical engineering from the University of Minnesota in 1931.

Right: End of a successful fishing expedition in the Atlantic off the Jersey coast. Surrounding the catch are the fishermen involved. At the left, standing: H. E. Johnson and H. E. Jones, Triangle Chemical Co., Macon, Ga. Kneeling, the skipper of the fishing vessel and Jack Hewitt, Lebanon Chem. Co., Lebanon, Pa.

On the right, standing, are Bill Merritt, H. J. Baker & Bro., New York, and Wayne E. Dorland, *Agricultural Chemicals*, New York. Kneeling below, are Mrs. Merritt and the fishing boat's mate.

The participants report that the day's catch confirms rumors heard for years to the effect that the waters extending several miles east of the coast, contain some mighty interesting fish.

Outstanding Speakers on agenda of Chicago

Fertilizer Safety Conference

THE third annual meeting of the Fertilizer Section of the National Safety Council will be held October 21 and 22 at the Hamilton Hotel, Chicago. The fertilizer section will meet in connection with the NSC's annual conference, billed as "The Biggest Safety Show on Earth."

As indicated previously, the Fertilizer group's meetings will be held in the Hamilton Hotel with John E. Smith, director of safety, Spencer Chemical Co., Pittsburg, Kansas, in charge. Mr. Smith is general chairman of the fertilizer section, and as such will present his annual report to the assembly.

A report of the nominating committee and election of officers for the coming year will be part of the agenda for the afternoon of October 21.

Jack S. Fields, industrial relations superintendent, Phillips Chemical Co., Borger, Texas will talk, followed by an address by Dr. S. L. Rankin, Medical Director, Petroleum Chemical Division, Employee Relations Dept., E. I. duPont de Nemours & Co., Inc., Wilmington, Del. His subject: "Safety—A Way of Life."

Scheduled at 3 p.m. is a panel discussion on case histories. Discussion leader will be Harold R. Krueger, production manager, Snyder Chemical Co., Inc., Topeka, Kansas. A panel of six safety directors, factory superintendents and production superintendents will give the details of at least one outstanding industrial accident occurring in his plant within the past year or two. They will describe the cause of the accident, report how the investigations were conducted and then relate what steps were taken to prevent repetition. Each accident will be discussed from the floor.

Participants in this panel will be R. F. Bennett, president, Farm Fertilizers, Inc., S. Omaha, Nebraska; Victor L. Cherry, Plant Safety Inspector, Mathieson Chemical Corp., North Little Rock, Ark.; Thomas J. Clarke, personnel director, GLF Soil-Building Service, Ithaca, N. Y.; Ralph E. Fraser, vice-president, Summers Fertilizer Co., Baltimore, Md.; and W. A. Stone, superintendent, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.

A report on the safety contest which has been under way for the past year, will be made by Curtis A. Cox, assistant manager, Manufacturing Department of Virginia-Carolina Chemical Corp., Richmond, Va. Mr. Cox will also present final announcements concerning the trip to Chicago Heights, Ill., the following day, to witness a carbon dioxide blasting demonstration.

Thursday's Program

CHARTERED buses will depart from the front of the Hamiltons Hotel at 8 o'clock Thursday morning, to take the fertilizer safety men to the Chicago Heights plant of International Minerals & Chemical

Fertilizer Industry's Third Annual

Safe method of reducing stored fertilizer to be demonstrated at IMC plant; panel discussion of case histories; report on safety contest; and discussion on how state governments figure in safety programs sponsored by the industry. Chicago meeting promises to be best to date.

Corp., where the Cardox Corporation will demonstrate blasting techniques with CO_2. The demonstration will be in charge of G. M. Henry, manager of the Lime and Steel Division of Cardox.

A luncheon for the executive committee of the Fertilizer Section of NSC has been arranged through the courtesy of the American Plant Food Council, Inc.

Paul T. Truitt, A.P.F.C. president, will preside at the gathering and the invocation will be made by E. O. Burroughs, Jr. F. S. Royster Guano Co., Norfolk, Va.

Mr. Truitt will welcome the group and introduce members of the executive committee and guests, following which the name of the new general chairman of the Fertilizer Section, will be announced and he will be introduced. The new chairman will address the luncheon group briefly, outlining the aims and objectives of his administration. The executive committee will then select the time and place for its next meeting.

Sessions will resume in the afternoon at 2 o'clock, according to the program. At this time the meeting will be in charge of the chairman-elect who will outline the goals and objectives being sought by the Fertilizer Section during 1954.

Dr. Neal Bowman, representing the National Association of Manufacturers, New York City, will address the group on the subject of "Blue Print for Survival" in which he is expected to point out the necessity for greater efforts toward safety throughout the industry.

Whether the State Safety Department should be regarded as a "Friend or Foe" will be discussed by Forrest H. Shuford, commissioner of Labor, State of North Carolina, Raleigh, N. C. Commissioner Shuford has been responsible for an outstanding program of safety throughout his state and is regarded as an authority on the subject.

An expert in another phase of the problem is Ralph J. Crosby, assistant vice-president in charge of accident prevention for Marsh & McLennan, Inc., New York City. He wil address the group Thursday afternoon on the subject: "The Cost and Profit of a Successful Safety Program" as the final formal talk.

The program will end, however, at the conclusion of a final question and answer program arising out of the previous talks, the CO_2 blasting demonstration of Thursday morning, or from problems existing in fertilizer plants at home.

During this portion of the program, the chairman will ask for questions from the floor regarding accident prevention in the fertilizer industry. It is emphasized that this will not be a panel discussion; questions coming directly from and being answered by the group. "There will be no speeches and no experts selected to answer," the advance program states.

Safety Meeting, Chicago, October 21-22

American Cyanamid Co. Opens its new, modern

Agricultural Chemicals Laboratory

AMERICAN Cyanamid Company opened its new agricultural chemicals research laboratory at Stamford, Connecticut on September 16, with an open house for the press. Members of the staff explained the new facilities and the visiting editors were conducted on a complete tour of the new building and greenhouses.

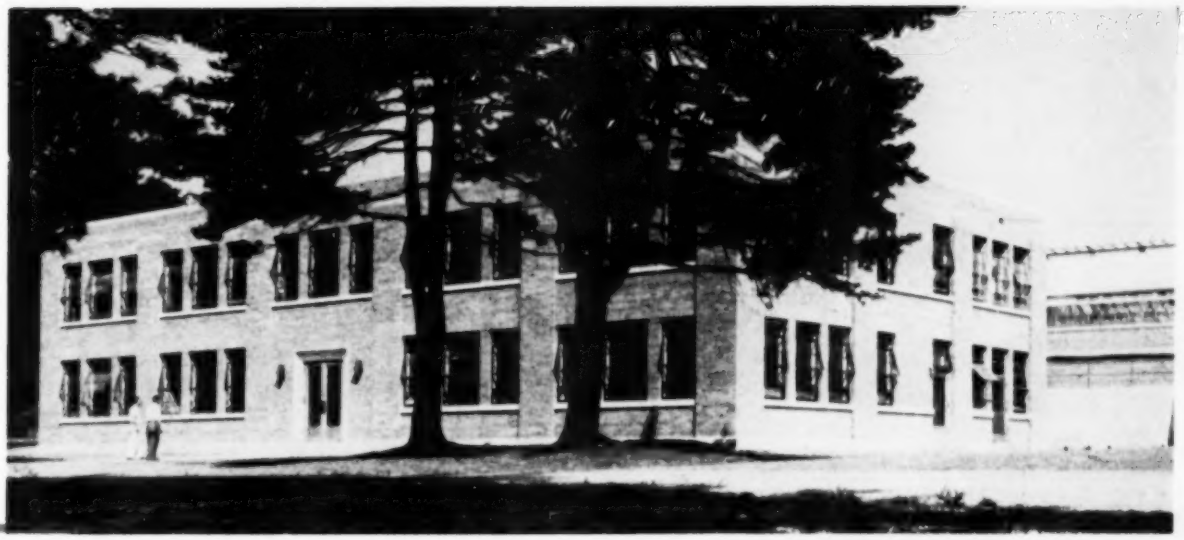
Frank S. Washburn, director of the Agricultural Chemicals Division welcomed the group and Dr. J. T. Thurston, director of the Stamford Research Laboratories added his words of welcome and reviewed some of the history of the laboratory's expansion. In 1936, he said, the employees numbered around 50, while today's roster is over a thousand.

M. V. Bailey, director of Agricultural Chemicals Research, recalled that the company began as an agricultural chemical firm and is still enthusiastic about the future of chemicals in agriculture. He declared that cut-backs in acreages in the U. S. will increase the importance of both fertilizers and pesticides in reducing unit costs.

Dr. Frank Stark, describing the type of work to be done at the new laboratory, said that many compounds will be examined to determine their possible use in agriculture. Those showing promise, he said, will be tried out further to study their toxicity not only to pests, but to plants and to warm-blooded animals, as well.

The new laboratory, under construction for nearly two years, is built of reinforced concrete with two greenhouses adjoining. Provision has

Below: One of the several laboratory rooms in the new Agricultural Chemicals research facilities of American Cyanamid Co. Both chemical and biological research will be conducted here.



been made for building additional greenhouses in the future, when necessary, and the entire laboratory was designed for ease of movement and ready accessibility of one section to the others. Total area of the new building is more than 21,000 square feet, the company states.

The first floor of the building will be devoted primarily to research on insecticides, with certain rooms designed for evaluating compounds to determine their toxicity to insects. A conditioned room will be used to raise species of insects needed for this work. In one of the rooms on the first floor, three chambers are to be installed for controlled environmental conditions of temperature, humidity and light, thus enabling researches to simulate any type of weather condition for different parts of the country. The company states that this new lab is perhaps the only one in industry to have such equipment.

Chemical and biological research on fertilizers, herbicides, and fungicides will be conducted in six laboratories on the second floor. In addition, there are offices, a conference room, wash rooms, showers and other general purpose rooms on this floor.

The working corridor connecting the two greenhouses opens off the second floor. In the corridor is dusting and spraying equipment for

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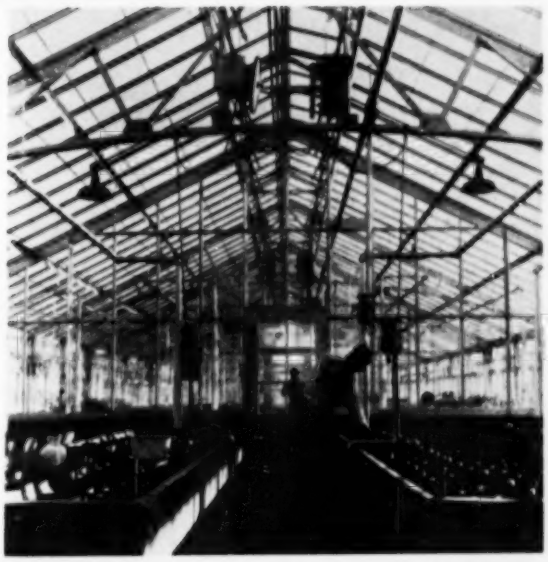


Above: Exterior view of the new agricultural chemicals laboratory at American Cyanamid's central research laboratories in Stamford, Conn.

Right, above: One of two greenhouses connecting to the new laboratory. Each greenhouse is 110 feet long by 30 feet wide. Both are equipped with automatic equipment to open and close windows to maintain desired temperatures.

Right, below: Efficient equipment for accurate delivery of a given amount of a compound is essential. The specially-designed dusting hood prevents drift into the room, but permits a maximum deposit on the plant material.

Trace Elements, Application, and Merchandising Discussed at

N. J. Fertilizer Conference

DISCUSSIONS on technical phases of fertilizer application and use were featured at the September 24th meeting of the New Jersey Fertilizer Conference at Rutgers University, New Brunswick.

With William H. Martin, Dean of the College of Agriculture as chairman, the Conference heard talks by representatives of the University, the Agricultural Experiment Station, a county agent and a representative of industry.

In his opening remarks, Dean Martin welcomed the group, commented on accomplishments of the past year and expressed the hope that fertilizer manufacturers in the State may follow the list of grades recommended by the College to reduce problems involved in having extra grades to consider.

Dr. Firman E. Bear, chairman of the Soils Department, reported progress made in recent research in trace elements. Speaking from data contained in a group of tables he had prepared, Dr. Bear described the trace element content of 20 types of soil found in New Jersey; the amounts of these elements found in various plant species grown on Sassafras Loam; the relation of pH in the same type of soil to trace elements in soybean plants; and the content of water-soluble trace elements found in rainwater at the Experiment Station.

Using trace elements of manganese, zinc, copper, cobalt, nickel, boron, iodine and iron as specific examples, Dr. Bear reported the presence of these elements as ranging from 5200 ppm of manganese in Norton silt loam to 0.2 ppm of cobalt in Lakewood sand.

In reporting the parts per million of trace elements in plant species, he noted that certain weeds, including pigweed, purslane and ragweed contained relatively high amounts of various elements. Pigweed, for instance, contained 1.8 ppm of molybdenum, 308 ppm of iron, 65 ppm of manganese, 33 ppm of zinc, 8 ppm of copper, etc. Similarly, ragweed contained significant amounts of some of the elements, such as 426 ppm of iron, 60 ppm of zinc; 13.5 ppm of copper and 1.35 of nickel. Purslane was particularly high in its content of copper and nickel, with 19.0 and 2.08 ppm, respectively.

He commented on the possibility that weeds may contribute some trace elements to crops, but added that there appears to be no immediate cause of alarm lest all weeds should be eliminated.

W. R. Allstetter, vice-president of the National Fertilizer Association, Washington, D. C., discussed with the group what the fertilizer industry should like to see transpire in institutional research.

He pointed out that since basic research is the foundation of applied science, the fertilizer industry needs more, not less, of this type of seeking.

In addition to this, however, "we feel that a great deal more effort should be placed upon interpreting results of research findings in economic terms", he declared. The busy farmer . . . wants to know what the application of research will mean to him in terms of dollars and cents. Farmers usually apply fertilizer to increase their earnings . . . not to prove scientific theories," he continued.

With this fact in mind, Mr. Allstetter declared, fertilizer usage should be explained to farmers in terms of its effect on his profits per acre and his unit costs of production. In order to do this, response data must be analyzed from the standpoint of economics.

Showing the farmer how the application of fertilizer will increase the yield of crops is not sufficient, the NFA vice-president continued. "This does not show the whole story to the practical farmer nor to the fertilizer salesman, who is, after all, a salesman of applied science. If the salesman were armed with data from his Land-Grant College, showing what effects on costs and profits could be expected from a given use of his products, he would be a better salesman from every standpoint."

Dr. Bear reports on trace elements found in New Jersey soils and in harvested crops. Foliar sprays for plant feeding described as "corrective" measure rather than complete program by itself, as reported by Davidson.

DR. FIRMAN E. BEAR

DR. Wm. H. MARTIN

By projecting slides on the screen, Mr. Allstetter illustrated what he meant by the presentation of economic facts and figures to the fertilizer user. Using figures supplied by agricultural experiment stations in different states as a basis, the speaker translated the yield data into what it meant in dollars and cents to the user. When the grower sees a profit of 251% rather than a gain in a few extra bushels of corn or wheat, he will sit up and take notice, it was pointed out. Economic charts may be worked out in graphic form as well as in figures, Mr. Allstetter showed.

A description of the operation of the Gloucester County Soils Laboratory was presented by Roy L. Flannery. With more than 200 farmers supporting the laboratory, soil samples from practically all parts of the county have been collected and tested, Mr. Flannery reported. The farmers pay in advance a fee of $25 for testing to be done.

By having the laboratory located near by, immediate testing of samples is assured, with some reports being given out the same day. Farmers are being taught how to take their own samples in order to cut down on both expense and time involved in sending someone out to take the samples.

After soil samples have been taken and the farmer's general program of operation taken into consideration, fertilizer recommendations are made in accordance with grades advised by the State Experiment Station.

The best means for fertilizing fruit crops in New Jersey were discussed by Ernest G. Christ, extension fruit specialist. He presented a series of slides picturing trees at various stages of need for plant food and said that complete fertilizer is usually needed in orchards, rather than nitrogen alone.

As to placement, he said that there is a considerable amount of opinion, with some recommending application in a narrow band, others by a broadcasting method and still others advocate placement under trees in a wide area. Which is best?

Mr. Christ said that best results have been obtained by placing the fertilizer material on the ground under the limbs where the roots can utilize the added plant food. He also pointed out that the best time to apply the fertilizer is in the fall of the year, rather than in the spring. If applied at the beginning of the season, a considerable portion of the nutrients goes to feeding grasses and other vegetation on the ground. In the fall, however, the roots of the tree can take full advantage of the plant food.

A series of ten-minute reports on current fertilizer work in New Jersey was presented by members of the Rutgers staff in the afternoon session. Dr. E. R. Purvis spoke on "High Nitrogen and Potassium Fertilization of Alfalfa"; H. F. Perkins, on "Chelated Trace Elements"; R. S. Snell on "Spring Applications of Nitrogen to Small Grains"; C. H. Ramage, on "Fertilizing Orchard Grass for High Yield" and O. W. Davidson, on "Nutrient Foliar Sprays."

In discussing the latter subject, Mr. Davidson pointed out that foliar sprays are attracting great interest at the present, but their use is not particularly new. For many years a certain amount of this type of fertilization has been employed in greenhouses on plants such as azaleas and hydrangeas.

However, interest in application of trace elements, particularly in application of urea, focused renewed interest in the subject and "really got it going", Mr. Davidson said.

Whether foliar sprays should be used as a total program for plant fertilization was doubted by the speaker who said that the method should be used mostly as a corrective measure rather than as a complete program.

In the first place, he pointed out, full knowledge of how to do the

(*Turn to Page 105*)

Boyce Thompson Institute head sees promise of better control of plant disease as he presents this study on

The Future for

ABOUT a half billion pounds of fungicides are being used in American agriculture this year, for the control of many plant diseases. In such widespread use, what materials comprise the bulk of the applications made? As before, sulfur, lime sulfur, and copper compounds remain as the leading materials, but the new organic compounds are gradually enroaching on the markets. The dithiocarbamates have found extensive use as protective sprays for potatoes, tomatoes and grapes. The imidazoline, quinone and captan sprays have been popular on apples. It is a fact that more plant diseases are being controlled better, with less damage to the crop or hazard to the spray operator and consumer, than ever before.

Farmers and orchardists have responded well to this improved service from industry, as indicated by the increased consumption of fungicides which has taken place regularly during the post-war period. Potato growers, for instance, have come to accept a five or seven day spray schedule so they could obtain full protection through use of the milder organic fungicides. Many had assumed that they would never spray more often than every two weeks or ten days, but apple orchardists have learned to use combinations of two fungicides in the same application in order to obtain maximum protection against fungi such as scab and rust.

Such teamwork between industry and agriculture has paid off during the late war and post-war periods when the world was crying for food. The 99 per cent increase in yield of potatoes was largely due to the availability and wise use of new pesticides. Although the insecticides were preeminently responsible for this improvement, the better control of disease was a strong factor. Better fruit with higher quality of finish is available because of the new fungicides, and yield of quality vegetables is better than ever before.

by

Dr. George L. McNew*

Managing Director
Boyce Thompson Institute for Plant Research, Inc.
Yonkers 3, New York

* Address at the National Agricultural Chemicals Association 20th Annual Meeting, Spring Lake, New Jersey, September 11, 1953.

Goal is still Ahead

IN view of such progress, are all the fungicide problems solved? Have we arrived at the place where we should be satisfied? It would hardly seem so when the U. S. is still suffering annual losses of about two billion dollars from plant diseases. There are entire groups of diseases that are almost unhampered by our best techniques. Fields are often abandoned because of "root rot" on various crops; some wilts are controlled only by resistant varieties that are not necessarily the best market types; and rusts go on a temporary rampage when a new race appears that can attack the popular variety of the day. At least half of the two billion dollar loss should be amenable to control if the right chemicals were available and farmers knew how to use them. The farmers could afford to pay well over a hundred million dollars for such protection of their investment in crop culture. Industry can afford to spend more on fungicide research in the future than it is at present to bring this market into reality.

We have taken a conservative attitude by assuming that no more than half of the loss can be controlled. This estimate is based on current observations that some diseases are of

Fungicides

such minor importance or so sporadic in appearance that the farmer cannot afford to protect his crop fully every year or to seek complete control of regular diseases for which he sprays every year. However, if the time comes when we have therapeutic treatments rather than the 1950 model surface protectants, this viewpoint may be outmoded. All we have to remember is that progress in science opens new horizons that make yesterday's viewpoints look ridiculous. Fifteen years ago most of us took it for granted that we would have to accept the appreciable losses from cedar-apple rust and tomato anthracnose but today it is not necessary. Today we accept the destruction of pear and apple orchards by bacterial blight as almost inevitable, but tomorrow will be a new day if preliminary data, to be discussed later, are any indication.

What do we need to continue this revolution in viewpoints—to perfect disease control? We need new viewpoints, new faith supported by dollars, and the proper basic information so our research methods will become more adequate. It is well to look into some of these needs and review the progress that is being made in research today. For convenience, we will restrict ourselves to the fields of chemotherapy, basic mechanism of fungicide action, and principles in formulation of fungicides.

Chemotherapy

FUNGICIDES, with very few exceptions, are used as surface protective agents. These deposits, applied in anticipation of the appearance of the fungus, must be repeated as new foliage develops and the fungicide is lost due to weathering. A more ideal treatment would be to apply materials that would be absorbed through roots or leaves and provide systemic protection to all parts of the plant. This would make it possible to destroy established infections on roots by soil-inhabiting organisms that are now protected from economical control, wilt organisms that live in the vascular tissues or foliage, and fruit parasites. Among the foliage and fruit diseases it has been impossible to secure adequate control of parasites that invade through the stomata because they often escape contact with the chemical on the epidermis.

There is good evidence that the bacterial diseases which have gone their own way unhampered by chemicals for so many years are going to be controlled. The bacterial blights of bean and fireblight of apple and pear have responded to treatment with Streptomycin and Terramycin according to data released in September at the American Phytopathological Society's meeting in Madison, Wisconsin. These materials are sufficiently systemic so they provide rather general protection.

For over two decades we have seen orchards and fields rendered unprofitable by bacteria. Now that the antibiotics people have begun to open up the leads, there is good reason to believe that the organic chemist may do as well or better in the synthetic field.

This development is much more significant than it appears on the surface. It will be presented to the public as a systemic protection of plants and the Food and Drug Administration will be called upon to approve or reject a chemotherapeutant for plant diseases. There scarcely could be a better method for industry to secure a favorable decision. Here we have materials that are being administered directly to human beings in relatively heavy dosages and even have been available for self-medication in various forms. Furthermore, they are being fed to livestock that are used for food purposes. It is logical to assume that if they are safe on humans and livestock, there will be no serious human toxicological

property from use on plants. There is every reason to believe they will eventually be registered for use on crops.

If the antibiotics are rejected for toxicological reasons, the entire field of chemotherapy for food crops will receive a setback. As mentioned previously, chemotherapy holds great promise for some diseases that are not amenable to the ordinary surface protectant sprays, but it would be several years after such materials were found and shown to be effective before they would receive approval for unrestricted use. The necessity for proving their safety for animals and securing information on their persistence in the plant, the possible selective accumulation in excessive quantities in various plant tissues, and the possibility of formation of secondary toxicants by reaction with normal cell constituents would call for prolonged and expensive research.

It is fortunate that the materials being introduced in this promising field have such favorable background of experience and are not new and untried synthetics. Both industry and the Food and Drug Administration can approach the problem with an objective viewpoint and give the materials a fair trial without subjecting the public to undue hazard.

Fungicidal Action

MOST of the research on fungicides has been done by empirical testing. Fairly reliable methods have been developed for evaluating fungicides in laboratory and greenhouse so field performances can be predicted within certain limitations. The great weakness in the present research program is that the chemists and biologists do not know exactly how fungicides act. New compounds are being synthesized without knowing exactly what functions they are to perform. In other words, there is a great weakness in conceiving new ideas because the scientists are working in a vacuum. The only way to correct this condition is to study the basic principles and develop some sound laws regarding the mechanics of protecting foliage and killing fungi.

The basic principles of fungicide action can be attacked by three types of studies. These are the effect of chemical constitution on fungicidal action, the methods by which spores are penetrated, and the mechanism by which vital processes of fungi are destroyed.

The relationship of chemical structure to fungitoxicity is an important study. There is a respectable volume of information accumulating on the relationship of chemical structure to fungicidal potency. Such data naturally accumulate in the course of empirical testing if the organic chemist on the project has any imagination at all. In the process of seeking the preferred member of a new class of fungicides, he automatically tries related structures and various substituents on the molecule. Unfortunately, much of these data are never published because too many people cannot see the value of negative achievements. Often the data are never assembled in one place where they can be readily surveyed. There are a few good examples of published data that are worthy of our examination.

Among the quinones it is known that naphthoquinones are better fungicides than benzoquinones with analogous substituents. The anthraquinones are worthless but phenanthraquinone is very effective. It is assumed, therefore, that a double bond must be available for reaction with cell constituents. Halogenation increases the effectiveness of the molecule, with chlorine being preferred to bromine or iodine. The substitution of an alkyl, aryl, or other substituent ortho to the carbonyl group may reduce activity appreciably.

Among the heterocyclic nitrogen compounds, the pyrazoles are good fungicides when they bear the right substituents. The primary requirement is for a nitroso group in the 4-position. The further substitution of an aryl group in the 1-position multiplies the effectiveness several-fold. Further increase in activity may be secured by halogenation of the 1-aryl group in the para position.

The closely related imidazoline nucleus may be activated by substitution of an alkyl group in the 2-position. In a homologous series, both fungitoxicity and phytotoxicity increase as the length of the side chain increases up to 11 or 13 carbon atoms. Further increase beyond this point results in a decrease in phytotoxicity but further increase in fungitoxicity. At 17 carbon atoms, fungitoxicity begins to decline. The development of a commercial product depends upon selecting a member with 17 carbon atoms where fungitoxicity is at a peak and phytotoxicity is appreciably less.

Among the quinoline compounds, the 8-hydroxy member and its copper derivative are supreme. The addition of another nitrogen to the heterocycle or the removal of the hydroxyl group to other positions, depreciate fungitoxicity. In other words, fungitoxicity depends upon a specified relationship between nitrogen in the ring and the hydroxyl group in the 8-position.

There are other fungicidal nuclei that have been studied but these may serve as illustrations of what can be learned by empirical testing of a series of compounds. The question, however, is—Why do we get these particular effects. We obviously have changed either the ability to penetrate spore walls of the fungus, or ability to react with cell constituents. We may look at these two phenomena briefly.

Penetration of Spores

NO one knows beyond doubt as to where fungicides operate on spores. They may be active at the surface of the plasma membrane but it is more likely, from evidence available, that they penetrate into the cytoplasm and interfere with vital biochemical processes. We started investigating this problem by using fungicides labeled with radioactive tracers at Boyce Thompson Institute over three years ago. Drs. Miller and McCallan and Mr. Weed have shown that our standard fungicides are not half as potent as had been assumed. Although 0.1 to 10 p.p.m. of chemical in solution is sufficient to destroy spores, the spores were found to contain 1,000 to 20,000 p.p.m. of toxi-

cant when they die. In other words we have no really good fungicides today in the sense that DDT can destroy insects or that pharmaceutical chemicals are effective at a fraction of a p.p.m. to 10 p.p.m. of body weight.

What our new organic fungicides do have is tremendous ability to penetrate spores. Within two to five minutes after spores are placed in a dilute suspension of heptadecyclimidazoline the spores will have accumulated about 6,000 p.p.m., a lethal dose. The spore is almost like a dry sponge in its ability to take up this fungitoxicant.

Peculiarly enough, spores that have taken up a maximum supply of heptadecylimidazoline are still capable of accumulating a full dose of cerium or silver. It follows that these three materials probably react at different sites inside the spore and hence do not interfere with one another. Furthermore, they are readily taken up regardless of whether the spore has an effective dosage of another fungitoxicant so their uptake is not dependent upon vital processes of the spore so much as upon their own ability to get through the heavy outer wall and its layers of lipoid material.

We do not yet know whether closely-related materials such as tetracholoroparabenzoquinone and 2,3-dichloronaphthoquinone will interfere with each other. It is logical to assume that they may if they react with similar cell constituents. Studies will be continued to see whether changing a single substituent on a molecule will alter ability to penetrate cells already occupied by the parent nucleus. By this means we hope eventually to decide which substituents are vital for penetration and which alter the basic chemical reactivity with cell constituents.

Penetration Properties

THERE is good reason to believe that fungicides are penetrating the cell completely because they cannot be removed by washing. Furthermore, in the quantities taken up the spores would have to form a film consisting of ten monomolecular layers if all chemical was retained at the surface. Finally, it is difficult to assume that several fungicides would pile up one on top of the other at the surface without interference with each other. Rather than tax your credulity, we will assume that they are being absorbed more than adsorbed, although the latter may occur to a limited extent.

How do various substituents affect the penetrating power of a molecule? The molecule must transfer from an aqueous phase in the spray deposit through several layers of oily and waxy substances in the spore wall through a plasma membrane and back into the aqueous medium of the cytoplasm. If so, it should contain both polar and lypoid-solubilizing groups.

There is good evidence that certain substituents operate in enhancing penetrability in this fashion. Rich and Horsfall of Connecticut have shown that varying substituents on the imidazoline and pyrazole nuclei regulate the ability of these fungicides to be partitioned in olive oil-aqueous systems almost in proportion to the effect on fungitoxicity. At present there seem to be three important lipoid-solubilizing groups that may be used on fungicides. These are the alkyl side chain on the imidazoline nucleus, the parachlorophenyl and similar groups on pyrazoles, and trichloromethyl group on the phthalimide nucleus. Apparently, the lipoid in fungus spores and the cuticle of leaf tissues are enough different so they respond to different lengths of alkyl side chains in the imidazoline group.

The research on penetration of the fungus body has only begun. It offers great possibilities for the future in developing better and safer fungicides. It is entirely conceivable that safety for various crops will be regulated some day by varying the nature of the lipoid-solubilizing groups to fit the type of cuticular materials present on fruit and foliage.

Before we leave this subject, it is only fair to point out that fungi can be destroyed by an entirely different mechanism from the accumulation of massive dosages as just described. Sulfur is apparently unique in that it does not accumulate. The molecule is reduced to hydrogen sulfide almost immediately upon gaining contact with the spore. The hydrogen sulfide is immediately released to the air. Contrary to previously established conceptions, there is little valid reason for assuming that the hydrogen sulfide is the lethal agent. We now believe it is a by-product of the fungicidal mechanism which may be found more appropriately in the drain on the hydrogen transport system of the spore body. The spore usually succumbs after converting sulfur equivalent to some 20,000 p.p.m. of its body weight into hydrogen sulfide over a ten to twenty hour period. No other analogous process is known.

Formulation Problems

THE ordinary protective fungicide must be available to the germinating fungus spore whenever it lands on fruit or foliage. The material, however, must persist through rain, sunshine, and exposure to various other forces of oxidation and hydrolysis. Nominal deposits must be made in the interests of economy and to lessen the chances of plant injury. Several years ago Burchfield and the writer undertook an analysis of the factors contributing to economic deposition of fungicides on foliage, using 2,3-dichloronaphthoquinone as the subject.

This material has been found to be very effective against several diseases under field conditions when used at the rate of one to one-and-a-half pounds of chemical in 100 gallons of spray. When certain special mixtures used at half a pound were equally good, the phenomenon was investigated. Evidence was obtained that the standard material had not been properly ground and contained many large particles while the special formulation contained a much larger proportion of particles less than 10μ in radius. Studies were undertaken to determine the relative importance of various sized particles in destroying spores and in persisting on foliage.

A sample was fractionated so seven classes of particles were obtained that varied from 24.5 to 0.45μ in

(*Turn to Page* 109)

Four Organizations of Control Officials

AGRICULTURAL chemical control officials on both state and federal levels were to meet in Washington, D. C. for the entire week of October 12 to 17, inclusively, for the annual conventions of four associations. The Shoreham Hotel is headquarters for the six-day gathering.

The four organizations holding sessions during the week are: the Association of Official Agricultural Chemists; Association of American Feed Control Officials, Inc.; Association of American Fertilizer Control Officials; and the Association of Economic Poisons Control Officials, Inc.

Opening its sessions on Monday morning, October 12, the Association of Official Agricultural Chemists will hold meetings for three days, covering the subjects of foods, feeding stuffs, soils (including possible discussions of methods of analysis and evaluation of soil conditioners), disinfectants and economic poisons, fertilizers, drugs, cosmetics and vitamins.

The forty-third annual convention of the Association of American Feed Control Officials, Inc. holds its meetings October 14 and 15. President J. D. Patterson, Salem, Oregon, will address the group on the 14th and executive secretary L. E. Bopst, College Park, Md., will present his report to the Association.

"Feed Control in the New Era" is the title of a talk scheduled to be given by W. E. Glennon, president, American Feed Manufacturers' Association, Chicago.

The Feed Officials' program continues through Thursday, October 15, with a full program being held in both morning and afternoon sessions. "Cottonseed Products" will be discussed by A. L. Ward, director, Educational Service of the National Cottonseed Products Assn., Dallas, Texas.

N. R. Ellis, Bureau of Animal Industry, U. S. Department of Agriculture, Beltsville, Md., will talk on "Building the Concentrate-Roughage Ration"; and Dr. H. Ernest Bechtel, director, Larro Research Farm, Detroit, Mich., will speak on "Quality Control in Feed Production".

Final speaker of the morning session will be Dr. H. R. Kraybill, director, Research and Education, American Meat Institute Foundation, Chicago, Ill.

The afternoon session will comprise a business meeting, election of officers and reports of committees.

Fertilizer Officials

A FULL day's schedule of addresses and reports is planned by the Association of American Fertilizer Control Officials on Friday, October 16. Secretary-treasurer Bruce D. Cloaninger, Clemson, S. C. will open the meeting with his annual report, followed by Dr. Parks A. Yeats, Oklahoma City, Okla., president of the A.A.F.C.O.

Paul T. Truitt, president, American Plant Food Council, Inc., Washington, D. C. will follow in a brief address and Dr. Russell Coleman, president, The National Ferti-

Meet

lizer Association, Washington, is scheduled to appear on the program after Mr. Truitt.

"Problems for the Fertilizer Control Officals" will be the subject discussed by Ernest A. Epps, Jr., Baton Rouge, La. and "Evaluation of Secondary Elements in Fertilizers" is to be covered by Dr. Aaron Baxter, agronomist, Coke Oven Ammonia Research Bureau, Columbus, Ohio.

Dr. Jackson B. Hester, soil technologist, Department of Agricultural Research, Campbell Soup Co., Riverton, N. J., will report on the foliar application of plant nutrients while Dr. Vincent Sauchelli, director of Agricultural Research of the Davison Chemical Corp., Baltimore, Md., will present a paper, "Present Status of Surface Wetting Agents for Fertilizer Use," to complete the morning program on Friday.

The afternoon session will lead off with a paper, "Progress in Fertilizer Granulation" by Drs. J. O. Hardesty and R. M. Magness, U. S. Department of Agriculture, Bureau of Plant Industry, Beltsville, Md.

The meeting will terminate with reports of investigators. The following were scheduled to appear on this portion of the program: M. H. Snyder, Charleston, W. Va.; M. P. Etheredge, State College, Miss.; J. W. Kuzmeski, Amherst, Mass.; J. F. Fudge, College Station, Texas; R. W. Ludwick, State College, New Mexico; W. B. Griem, Madison, Wisconsin; J. B. Smith, Kingston, R. I.; R. C. Berry, Richmond, Va.; Gordon Hart, Tallahassee, Fla.; E. W. Constable, Raleigh, N.C.; John L. Monaghan, Topeka, Kansas; Parks A. Yeats, Oklahoma City, Okla.; F. W. Quackenbush, Lafayette, Ind.; A. H. Harris, Raleigh, N. C.; and Allen B. Lemmon, Sacramento, Calif. Mr. Lemmon's topic will be "Pesticides in Fertilizers".

The reports will continue, with presentations by E. A. Epps, Jr., Baton Rouge, La.; M. B. Rowe, Richmond, Va.; H. J. Fisher, New Haven, Conn.; Stacy B. Randle, New Brunswick, N. J.; and R. W. Ludwick.

Econ. Poisons Officials

SCHEDULING an all-day meeting for Saturday, October 17, the Association of Economic Poisons Control Officials, Inc. will begin its morning session with a report by the secretary-treasurer, Dr. A. B. Heagy, College Park, Md.

Following a roll-call by states and appointments of committees, Dr. Rodney C. Berry, Richmond, Va., president of the A.E.P.C.O. will deliver the annual presidential address. Three other speakers are scheduled for appearances at the morning session.

Dr. K. Starr Chester, supervisor, Battelle Memorial Institute, Columbus, Ohio, will report on "Looking Forward in Pesticide Research and Control"; Dr. Charles L. Smith, a member of the legislative committee of the National Agricultural Chemicals Association and associate director of Product Development of Ethyl Corp., New York, will talk on "Perspective in Legislation and Regulation."

Final speaker on the morning program will be Van Miller, vice-president, National Better Business Bureau, who will discuss "The Role of the National Better Business Bureau in the Advertising of Pesticides."

Committee reports are scheduled to occupy the afternoon session. On the agenda for that time are the following committee chairmen: E. A. Epps, Jr.; J. C. Ward; Stacy B. Randle; J. L. Monaghan; J. L. St. John; J. Claggett Jones; Allen B. Lemmon; J. J. T. Graham; A. D. Cromartie; Henry J. Hoffmann; and J. F. Fudge.

Members of the A.E.P.C.O. are to engage in a panel discussion to terminate the convention. Moderator of the panel, in which only members of the Association will participate, will be C. A. Bower, Oklahoma City, Okla. According to the advance program, this portion of the program will be an "informal and unrehearsed discussion of everyday procedures and problems in the enforcement of Pesticide Laws."

Officers of Control Officials' Association

Association of Official Agricultural Chemists

President: Dr. H. J. Fisher, Connecticut Agricultural Experiment Station, New Haven.
Vice-President: Dr. E. L. Griffin, Insecticide Division, U. S. Department of Agriculture, Washington, D. C.
Secretary-Treasurer: William Horwitz, Food & Drug Administration, Washington, D C.

Association of American Feed Control Officials

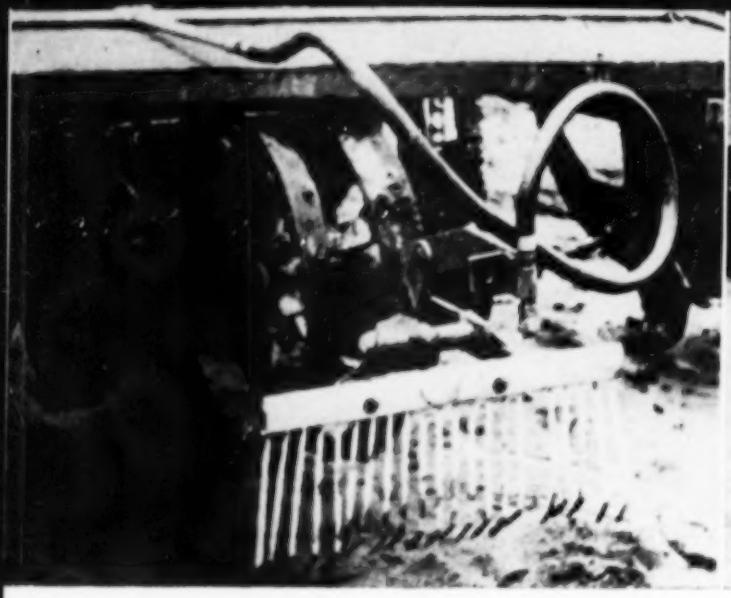
President: Dr. J. D. Patterson, Salem, Oregon.
Vice-President: Stacy B. Randle, New Brunswick, N. J.
Secreary-treasurer: Henry A. Lepper, Food and Drug Administration, Washington, D. C.

Association of American Fertilizer Control Officials

President: Parks A. Yeats, Oklahoma City, Okla.
Vice-President: Henry A. Davis, Durham, N. H.
Secretary-Treasurer: Dr. Bruce D. Cloaninger, Clemson, S. C.

Association of Economic Poisons Control Officials

President: Rodney C. Berry, Richmond, Va.
Vice-President: Floyd Roberts, Bismarck, N. D.
Secretary-Treasurer: Dr. A. B. Heagy, College Park, Md.



The Story Behind the Herbicide

Chloro-IPC

WITH the development of 2,4-D herbicides a few years ago, it became possible to control broad-leaved weeds under many conditions. While this accomplishment helped to solve many agricultural problems, it still left the narrow-leaved plants unharmed which in turn presented a considerable problem to growers in a number of fields.

Shortly following the discovery and development of 2,4-D, a herbi-

In the Photos:

Above, (L): Modified weed brooms mounted behind presswheels for light soils. (R): Planter fitted with rollers and nozzles to apply product during planting.

Below (L): Uneven bands result when product is applied at time other than during planting operation.

(R): Wide, weed-free bands show up after a few weeks. Middles offer contrast.

by
Eugene D. Witman

Columbia-Southern Chemical Corp.
Pittsburgh, Pa.

cide for controlling narrow-leaved plants (grasses) was found to be useful where harm to broad-leaved plants was undesirable.

Columbia-Southern Chemical Corp. immediately took an interest in compounds with such properties and its researchers sought other materials until announcing isopropyl N(3-Chlorophenyl) carbamate, Chloro IPC, as extremely promising.

Following the usual laboratory development and screening tests, limited field tests were made with Chloro IPC on various crops. Then many field tests were run at widely distributed points. The tests conducted at Holly Springs, Mississippi showed Chloro IPC outstandingly effective for the control of crabgrass in cotton. Columbia-Southern also sponsored an intensive field testing program, supported by grants-in-aid at leading research institutions throughout the country. This grant-in-aid program was expanded and limited sales to outstanding cotton producers were initiated.

During and since World War II the population changes, the scarcity of labor, its high cost, and widespread industrialization in the cotton South have necessitated new thinking on the part of the farmer. He realizes that his agricultural programs must be mechanized and "chemicalized" in order to survive.

With the advent of successful mechanical harvesters, the most important hindrance to complete mechanization was lack of effective weed control.

Every banker in discussing loans with farmers has had to cope with the unmeasurable cost of hand weed control — realizing that it was one of the major cost items of cotton production, yet knowing that it could not be accurately estimated.

Chloro IPC promises to reduce drastically the cost of growing cotton by saving labor, saving fertilizer and allowing complete mechanization.

Photos Below:

Left: Experience indicates that extremely heavy rains and excessive water may wash away soil surface and destroy effects of treatment.

Right: Normal rainfall, in moderate amount, increases effectiveness of Chloro-IPC.

For example, reports from the University of Missouri show that, where even in a dry year it cost $11.95 per acre to hoe weeds from untreated cotton, it costs only $0.56 per acre to hoe weeds from an acre of cotton treated with 3 pounds of Chloro IPC. Similarly, in Arkansas in a dry year it cost $11.91 to hoe an untreated acre and $2.57 to hoe an acre treated with 2 pounds of Chloro IPC. On the famous Coker Seed Farm a total reduction in cost of about 10¢ per pound of cotton was realized as a result of completing their mechanization of cotton production through the use of Chloro IPC. During seasons of heavy weed infestation hoeing costs frequently soar to as much as $30 per acre but the cost of chemical weed control remains constant at about $4.00 per acre.

Chloro IPC has now been used successfully for several years for the control of annual grasses in cotton. This year, 1953, was the first for a real "all out" commercial development by Columbia-Southern, in which it was joined for the first time by other producers. Many thousands of acres on large and small plantations were treated. Weather conditions over the last few years, and particularly the last two years, have varied widely from the extremes of dryness to wetness and coldness to heat. Under these conditions Chloro IPC has consistently given good to excellent results.

The farmer is supplied with a formulation containing four pounds

of Chloro IPC per gallon. He mixes it, usually, at the rate of two quarts of Chloro IPC formulation to 11½ gallons of water. This emulsion is then applied at the time of planting through spray nozzles mounted behind the planter presswheel or preferably a roller in place of the presswheel. Many growers prefer the "hill drop" planter in order to avoid disturbing the treated "band" by subsequent thinning operations. The 12 gallons of emulsion is sufficient to control grass weeds in 12 inch bands centered over the row on an acre of cotton.

In some instances, the spraying has been carried out as a separate operation. If this is done, the planting and spraying must be performed with great precision in order that the treated band is accurately centered over the planted row.

Chloro IPC, effective as it is, is not intended to be a substitute for good farming practices. The seedbed must be prepared carefully and the cottonseed must be planted properly to obtain the full usefulness of the herbicide spray. Also, supplementary weed control such as cultivation of "middles" without throwing soil on the treated band, post-emergence sprays, flaming etc., will be necessary depending upon the severity of the weed problem, the weed species present and, to some extent, the weather.

Cool, wet weather will prolong the residual period of Chloro IPC, while hot dry weather may shorten the residual period. Usually the chemical remains effective for four to six weeks. Light dosages will give effective control on light soils but on heavy soils, heavier doses may be required.

A few farmers found that improper mixing of the Chloro IPC in water is unsatisfactory, since if the chemical settles to the bottom of the spray tank, the first area treated will receive too heavy a dose. Such heavily dosed cotton may be stunted seriously. Even the normal dose may retard the rapid establishment of seedling cotton. This latter effect, however, is seldom serious. Complete directions for use are given on each package, of course, and the user is advised to read, understand, and follow all instructions carefully.

Experiments indicate that Chloro IPC exhibits a selective retarding effect on root cells of various plants. The emerging roots and young roots of grass plants are particularly sensitive, but the roots of plants such as cotton are quite resistant. These effects on roots are the reasons for applying this chemical to the soil before grass weed seeds germinate. Toward the end of the effective weed control period some crabgrass seedlings do manage to become established but their root systems are so stunted that some growers have facetiously remarked that a good sweeping with a broom would have removed them.

Apparently in the interest of economy some farmers tried to spray only an eight inch band instead of the minimum recommended twelve inch band. They found it nearly impossible to cultivate close enough to the cotton to remove the weeds on the "shoulders" of the bands. Each of these farmers suggests he will use 16 inch bands next year.

It has been noted that the absence of competition of weeds during the first few weeks of the cotton seedlings growth makes a definite tendency for more rapid establishment of vigorous plants.

After treatment, the "band" should be disturbed as little as possible. Cultivators should be fitted with shields to prevent throwing untreated soil into the rows. Thinning, if done at all, should be shallow. However, as the effects of Chloro IPC begin to wear off, dirt may be thrown to the row during cultivation.

Normal rainfall aids Chloro IPC, probably by keeping soil temperatures down; but heavy rains may wash away surface soil and destroy the treated band.

Many instances were reported where the treated cotton fields were completely under water, one or more times during the year, and still the herbicide performed perfectly.

Under optimum conditions it will give excellent control of annual grasses, such as crabgrass, annual morning glory, purslane and pigweed. No control, however, may be expected on perennial weeds (including trumpet vine, Johnson grass and Bermuda grass) and deep sprouting annuals such as coffee weed, nutgrass and cocklebur.

Since replanting of cotton seems to be the rule rather than the exception, a question is immediately raised concerning retreatment with Chloro IPC. If replanting is done, no retreatment is necessary when the weather has been cool and wet, if the new row is replanted exactly over the old row. However, if the weather has been hot and dry, retreatment will probably be necessary. Intermediate conditions may dictate the use of a partial dose on replanting. There are records showing two replantings and two retreatments—a total of three—and the 100 acres of treated cotton so treated produced over a bale to the acre! Thus retreatment does not necessarily impose a problem of injury due to overdosing.

Acute toxicity data available at present shows that Chloro IPC is of a low order of toxicity to small animals. Also notwithstanding all the handling by men during the manufacture, formulation and use, no reports of toxic effects have been received. Additional toxicological data are expected to be available soon.

Excellent control of weeds with post-emergence sprays of Chloro IPC has been obtained. However, for best results the spraying must be accurately directed as well as accurately timed. Cases are reported where two post-emergence applications following the usual pre-emergence application have kept cotton weed free from planting to harvest.

Chloro IPC has also been used successfully on a variety of vegetables such as onions, spinach, cabbage, etc. It is specifically toxic to the cucurbits. Chloro IPC is useful for controlling chickweed in established legumes and strawberries. However, its use on food crops cannot be recommended unreservedly until further data on translocation, residues and chronic toxicities are obtained.

Recent studies show Chloro IPC to be effective in fruit thinning and in extending the dormant period of table stock potatoes.★★

Sen. Russell, C. M. Ferguson on Atlanta program for the

National Fertilizer Assn.

TENTATIVE plans for its annual fall convention have been announced by The National Fertilizer Association. The meeting is scheduled to be held at the Atlanta Biltmore Hotel, Atlanta, Ga., for three days, beginning November 16. (The Association's executive committee will hold a meeting on the evening of November 15.)

The NFA board of directors are scheduled to hold a meeting at 10 o'clock Monday morning, with chairman Louis Ware, president, International Minerals & Chemical Corp., Chicago, in charge.

A full program of addresses, a reception, the annual banquet and entertainment has been planned for the general meetings to be held the following two days.

On Tuesday morning, with Mr. Ware presiding, three speakers are listed on the advance program. W. R. Allstetter, vice-president of the NFA, will address the group on "Broadening the Base of the Fertilizer Market."

The comments of a county agent will be heard next, when Raymond Rosson, Jonesboro, Tennessee, appears on the program to discuss "Fertilizer—A Cornerstone for Community Development."

To complete the morning's program, C. M. Ferguson, director of Extension Service, United States Department of Agriculture, Washington, D. C. will talk to the group on "The Place of Proper Fertilizer Use in Improving Agricultural Efficiency."

That evening, according to the program, a cocktail party will be held, compliments of Ashcraft-Wilkinson Co., Atlanta. The annual fall banquet will follow, with Mr. Ware as toastmaster. Entertainment will be provided, the NFA states.

Wednesday, November 18, will complete the convention with two addresses. The first will stress the need for greater efforts toward merchandising and selling, under the subject, "Salesmanship—A Forgotten Art."

Final speaker on the NFA program will be Senator Richard Russell, who is expected to inform the convention on "What's Ahead for the American Farmer."

According to Dr. Russell Coleman, NFA president, this year's convention is expected to attract a near-record attendance. The hotel reports heavy registration for the meeting.

DR. RUSSELL COLEMAN

LOUIS WARE

HON. RICHARD RUSSELL

Performance of Fungicides are Reported at Madison meeting of

American Phytopathological Society

WITH one of the largest registrations in its history, the American Phytopathological Society held its annual meeting at the University of Wisconsin, Madison, September 7 to 11. The meetings were held in connection with the sessions of the American Institute of Biological Sciences at the University.

APS president for the next two years will be George F. Webber, University of Florida, to succeed Dr. George L. McNew, managing director of Boyce Thompson Institute for Plant Research, Yonkers, N. Y. President-elect, scheduled to take office next year, is J. H. Jensen, University of North Carolina. Other officers named include Dr. Helen Hart, University of Minnesota, vice-president; Glenn S. Pound, University of Wisconsin, Madison, secretary; and Paul R. Miller, U. S. Department of Agriculture, Beltsville, Md., councillor. Retiring secretary is Dr. S. E. A. McCallan, Boyce Thompson Institute.

The Society announced that its next meeting will be held August 25-27, 1954, at Estes Park, Colorado.

Papers presented at the Phytopath meeting included many reporting the effectiveness of various fungicides in tests made during the past season or over a period of years. A paper by Robert E. Adams indicated that mist spraying has been less injurious to sour cherries and apples than hydraulic spraying. Comparative tests were made, and results indicated that fungicidal mixtures containing different adjuvants differ both in the severity of injury caused and disease control obtained.

The vapor action of certain mercury seed treatment materials was decribed in a paper by D. C. Arny and Curt Leben. Their procedure and results obtained were described as follows:

The vapor action of 4 seed treatment fungicides was assessed by placing the fungicide and oat seed infested with *Helminthosporium victoriae* in a closed container for various exposure periods. There was no direct contact between seed and fungicide. The amount of fungicide vapor taken up by the seed was measured by the Glomerella agar diffusion assay and was indicated also in greenhouse tests by the incidence of the Helminthosporium seedling blight. According to the bio-assay, "Panogen" was highly active across the air space, "Ceresan M" was slightly active, while "Setrete" and "Agrox" were relatively inactive. Seed exposed to "Panogen" and "Ceresan M" showed some activity after the hulls were removed, indicating that the vapor of these materials penetrated beneath the hulls. "Panogen" gave good control of seedling blight after 1 day exposure, "Ceresan M" only after more than 8 days, while "Setrete" and "Agrox" gave poor control even after 32 days' exposure. With a fixed amount of "Panogen" in the closed container, the amount of vapor taken up by the seed in the surface layer was inversely proportional to the amount of seed in the container, and the vapor penetrated less than 2.5 cm.

Donald Cation presented a paper, "Experiments with Actidione for Control of Cherry Leaf Spot."

He reported that in 1952, "Actidione" controlled leaf spot at 1 p.p.m. in 2 preharvest applications followed by 2 p.p.m. in 1 post harvest application. One application of 2 p.p.m. before harvest applied at any 1 of 3 dates from petal fall to 20 days later and another spray after harvest controlled perfectly. Unsprayed trees were 90% defoliated by August 1.

An early application of a 2 p.p.m. concentration gave some leaf injury but typical fruit dwarfing was observed only on 1 limb of 1 tree out of 20 under observation. Sprays of 2 p.p.m. and 10 p.p.m. resulted in total fruit abscission when applied in early bloom on the sprayed side of half-tree plots. Two applications of 2 p.p.m. prevented defoliation in a budwood orchard at East Lansing. Three to 4 applications in various combinations of 1 p.p.m. and 2 p.p.m. gave results superior to Bordeaux 4-6-100 in a commercial nursery. Applied after harvest as a 6× concentrate (12 p.p.m.) "Actidione" checked leaf spot. The remaining leaves held until final observation, Oct. 17.

William A. Feder, in discussing the influence of the feeding habit upon the nematocidal action of "Systox," said that experiments have shown that *Rhabditis sp.* and *D. dipsaci* nematodes are killed by ingesting "Systox," but the vapors of the toxicant are not lethal. However, "Systox" is supplied to plant cells upon which *D. dipsaci* feeds. *Rhabditis sp.* is also killed by feeding upon "Systox"-impregnated dead or inert material, the speaker stated.

Another paper covering the control of nematodes was presented by Julius Feldmesser. His work was "A Cytological study of the effects of the golden nematode, *Heterodera rostochiensis*, on tomato." The nematode larva, during its second stage, enters the tomato's growing secondary and tertiary roots. Cells near the worm's path are compressed or destroyed and some cells adjacent to the worm's head begin to develop abnormally, showing dense cytoplasm and thickened cell walls. During the nematode's third stage, giant cells become evident. They develop in the cortex and in the stele, causing discontinuity of some vascular elements and the retardation of differentiation of others.

During the fourth and fifth stages of the nematode's life cycle, giant cell areas become more extensive and individual giant cells become larger and more irregular in shape, cutting off greater areas of vascular tissues.

A comparison of fungicides for the control of strawberry leaf blight was made in a paper by Robert H. Fulton and Donald Cation. They reported that two control programs were compared on the Robinson variety, which is susceptible to leaf blight. *(Dendrophoma obscurans).*

An eradicative program consisted of a single application in the spring when the new leaves were emerging from the crown, of "Tag 331" diluted to ½ pint in 100 gallons. "Ferbam," "Captan" and fixed copper were evaluated as protectants, using 2 additional applications, prebloom and post-bloom. Unsprayed plots showed an average of 737 blighted leaf areas per 3 ft. of matted row. "Tag 331" reduced this infection to 15.5, "Ferbam" 121.5, "Captan" 135.8 and fixed copper 192.5. Foliar injury was noted only in plots sprayed with "Tag 331" where older infected leaves turned yellow and died. A slight black spotting appeared on the younger leaves. There was no apparent injury to the crown and the plants showed good recovery. "Tag 331" and "Elgetol" (sodium salt of dinitro ortho cresol) were compared in a post harvest application about August 1.

The number of healthy leaves resulting were as follows, checks (no spray) 15 per cent, "Tag 331" (½ pt.) 73.8 per cent, Tag 331" (1 pt.) 82.2 per cent, "Elgetol" (½ gal.) 30 per cent and "Elgetol" (1 gal.) 28.8 per cent. Similar results were obtained with the same program the next season.

Berch W. Henry described the effects of ethylene dibromide on nematodes associated with a root rot of southern pine seedlings. Nematode populations used in the experiment consisted of *Acrobeloides* spp., *Tylenchus* sp., *Ditylenchus* sp., *Aphelenchoides* sp., *Panagrolaimus* sp., *Diplogaster* sp., *Pratylenchus* sp., *Zeldia* sp., *Discolaimus* sp., and *Dorylaimus sp.* No nematodes were found in treated beds prior to seeding (3 weeks after treatment) and very few through the subsequent 4 weeks. At 5 weeks after seeding the population equalled, and by 8 weeks it was tenfold (2500 nematodes/100 cc. rhizosphere soil), that in the untreated beds. By 20 weeks after seeding, it had declined to 1.5 times that of the untreated beds. The increase in total populations in treated beds consisted entirely of *Acrobeloides* spp., which are not considered pathogenic.

Root rot was severe in the untreated and very light in the treated beds. It is proposed that the early protection from nematodes afforded by ethylene dibromide enables the pine seedlings to establish root systems before the onslaught of the root rot and that the rapid increase of nonpathogenic species in treated beds has no practical bearing on root rot control.

An evaluation of chemical treatment for the control of *Botrytis cinera* on strawberries was presented by Dwight Powell. His paper said that fungicide experiments have indicated promising results for gray mold control but small, replicated plots have not been satisfactory for a full season evaluation. A 2-acre patch of Blakemore was treated with 50 per cent "Captan" 4 times at 7-day intervals starting with the first bloom at the rate of 6 lbs. per acre per treatment. Prior to the first picking adjacent untreated rows showed 11 per cent mature fruit rot as compared to 1 per cent in the treated area. A wide variation of intensity existed within the treated (0-5 per cent) and untreated area (8-16 per cent). There was a gradation of infection from the area next to the un-

(*Turn to Page 99*)

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[1] Many manufacturers have requested permission to use the name Pyrenone on their labels and with certain restrictions – one of which stipulates their formula contains no toxic ingredients other than piperonyl butoxide and pyrethrins – permission has been granted. Further details furnished upon request.

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LISTENING *Post*

Seven Fungicides Used in Widespread Tests

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

MATERIALS such as "Phygon", "Spergon", and "Puraturf" used at heavy and costly rates gave control of snow mold (*Typhula* spp. and *Fusarium nivale*) in eastern Washington as early as 1948, acording to Roderick Sprague of the State College of Washington Tree Fruit Experiment Station, at Wenatchee. After it was found that spores were usually discharged in mid-November, and that these spores were important in causing mold in the wheat, an effort was made to obtain an effective fungicide to protect the wheat during the time of the November spore shower. "Ceresan M" gave promise in the spring of 1951 in a field with very light infection. In 1951-1952, 4 lbs. 11 oz. per acre of "Ceresan M" in a lightly dampened pumicite dust gave striking control in 1/20-acre strips.

In the third year's tests, in 1952-53 near Waterville, Washington, control observed in the plots on March 14 and rechecked on March 19 was again good with "Ceresan M" at 5 lbs. per acre. However, control was less dependable in the field in larger plots treated by plane. The weather during the winter wheat season of 1952-53 differed considerably from the average.

The summer and fall of 1953 had been very dry and spores were not discharged until almost December. The winter was mild and snow melted in early March over most of the area. The soil surface, instead of drying out, remained somewhat damp because scattered wet snows continued to fall. The plots treated by plane were not uniformly covered. Portions in swales or behind hillocks tended to show some infection in early March. By March 19, infection had spread appreciably in some areas and it was uncertain as to just how effective the treatment had been. This area had been treated with the usual 5 lbs. of "Ceresan M" in 40 lbs. of "NuGreen" (urea) fertilizer per acre. This combination has proved to be ideal from the viewpoint of the operator. The "NuGreen" was pelleted and the relatively small amount of "Ceresan M" was carried without evident dust. The combination had been suggested by growers who had the material applied on a small commercial scale on their fields near Waterville. By April 8, the treated plot did not appear so healthy as it did when it came out from under the snow several weeks before. However, the crowns of "Ceresan" treated plants were appreciably healthier than those given fertilizer alone. If reseeding to spring wheat, (which often is necessary in this area) can be avoided, the practice would be commercially feasible even during a wet prolonged thawing period such a occurred in March, 1953.

1952-53 was one of those rare seasons when fall-applied nitrogen was actually utilized during the winter in the Waterville area (Douglas County, Washington); but without the fungicide, "NuGreen" alone was completely ineffective as a control for snow mold. Numerous earlier trials of various fall-applied fertilizers without added fungicides have not been encouraging. Nitrogen fertilizer, however, is coming into fairly general use in Douglas County and adjacent areas. At wholesale prices the mercurial has been added to the fertilizer at an additional cost of only $2.50 per acre.

In smaller plots with fungicides applied by ground application in 1/20 acre units on November 14, 1952, the percentages of green leaf surface left in spring 1953 were:

TABLE 1

Average yield in bushels per acre associated with Ceresan and Panogen seed treatment for ten flax varieties grown in ten tests at five Iowa locations during the three-year period 1950-52.

Treatment	Redwood	Marine	B5128	Dakota C.I. 1138	Victory	Minerva	Redwing	Bison	Koto	Average	Percent of non-treated
Ceresan M	22.6	20.9	21.4	20.3	20.7	20.4	21.2	18.2	18.8	19.5	20.4	107.4
Panogen	22.1	20.3	21.0	20.1	19.5	19.8	19.7	17.9	18.2	19.9	19.8	104.2
No treatment	20.9	20.4	20.3	19.4	19.0	18.9	18.3	17.8	17.8	17.7	19.0	

TABLE 2

Average annual yield in bushels per acre associated with Ceresan and Panogen seed treatment for ten flax varieties grown in ten tests at five Iowa locations during the three-year period 1950-52.

Treatment	1950	1951	1952	3-year average 1950-52	Percent of non-treated 3-year average 1950-52
Ceresan M	29.0	14.3	17.9	20.4	107.4
Panogen	27.5	14.3	17.7	19.8	104.2
No treatment	26.5	13.6	16.8	19.0	

TABLE 3

Effect of seed treatment with different fungicides, applied in various forms and at various dosages, on the incidence of head smut in Bromar mountain brome.

No.	Treatment					Percent smut
	Material	Dosage oz./bu.	Methods of application	Slurry Conc. lbs./gal.*	Bu. seed/ gal. slurry	
1	Untreated	—	—	—	—	97.0
2	Ceresan M	0.5	Slurry	1	32	3.6
3	Ceresan M	1	Slurry	2	32	2.9
4	Ceresan M	0.5	Slurry	0.5	16	7.2
5	Ceresan M	1	Slurry	1	16	.8
6	Ceresan M	1.5	Slurry	1.5	16	1.8
7	Ceresan M	2	Slurry	2	16	.5
8	Ceresan M	0.5	Dust	—	—	1.6
9	Ceresan M	1	Dust	—	—	1.0
10	Ceresan M	1.5	Dust	—	—	.7
11	Ceresan M	2	Dust	—	—	0.0
12	Arasan SF	1	Slurry	2	32	52.6
13	Rrasan SF	2	Surry	4	32	44.2
14	Arasan SF	1	Slurry	1	16	46.6
15	Arasan SF	2	Slurry	2	16	49.6
16	Arasan SF	4	Slurry	4	16	37.0
17	Arasan	1	Dust	—	—	44.2
18	Arasan	2	Dust	—	—	29.3
19	Arasan	4	Dust	—	—	15.4
20	Arasan	6	Dust	—	—	13.8
21	Panogen	0.75	Slurry	0.75	16	1.6
22	Panogen	1	Slurry	1	16	0.0
23	Panogen	1.5	Slurry	1.5	16	.7
24	Panogen	0.75	Liquid	—	—	.7
25	Panogen	1	Liquid	—	—	.1
26	Panogen	1.5	Liquid	—	—	.8
27	Agrox	0.5	Slurry	0.5	16	85.2
28	Agrox	1	Slurry	1	16	60.7
29	Agrox	2	Slurry	2	16	41.2
30	Agrox	0.5	Dust	—	—	69.9
31	Agrox	1	Dust	—	—	40.1
32	Agrox	1.5	Dust	—	—	5.2
33	Mergamma	4	Dust	—	—	11.2
34	Mergamma	6	Dust	—	—	1.1
35	Vancide 51	2	Slurry	2	16	69.1
36	Vancide 51	3	Slurry	3	16	28.7
37	Vancide 51	4	Liquid	—	—	12.4
38	Vancide 51	6	Liquid	—	—	3.5

* pounds of material per gallon of water

"Agrox" (phenyl mercury urea) at 5 lbs. per acre, 15 percent survival; "Ceresan M" in talc 5 lbs. per acre, 45 per cent; "PMAS" 5 pints per acre, 60 percent; "Ceresan M" 5 lbs. in 75 lbs. "NuGreen" per acre, 90 per cent; and untreated, 10 per cent survival. Both "Agrox" and "Ceresan M" drifted in the slight breeze, and control was spotty in the talc-carried "Ceresan M." In 1951-52, when excellent deposit was obtained with a heavier pumicite carrier, "Ceresan M" without "NuGreen" gave outstanding control.

Results on Flax

TWO Iowa Agricultural Experiment Station workers, R. E. Atkins and C. S. Reddy, who reported results obtained at several Iowa locations during the three year period 1950-1952, state that the value of seed treatment for successful flax production has been demonstrated in many experiments. Flax growers have found the use of "New Improved Ceresan" or "Ceresan M" to be a profitable investment and many progressive growers include seed treatment as a "must" in their flax program. As additional seed treatment compounds are developed and improved varieties released, continued testing is necessary to enable accurate recommendations.

A total of ten replicated experiments were planted at central and northern Iowa locations during the combined 1950-52 seasons. Tests were located in central Iowa at Ames and in northern Iowa at Kanawha, Primghar, Marcus, and Sanborn. A split-plot design was used for each experiment, with varieties as the whole-plots and seed treatment compounds as the sub-plots. Three or more replicates were harvested at each location each year. Varieties tested were Redwood, B5128, Dakota, C. I. 1138, Victory, Minerva, Redwin, Bison, and Koto. Seed treatments used were "Ceresan M" at 1 oz. per bu. rate in all three seasons, "Panogen" (1.4% mercury) at 1½ oz. per bu. in 1950 and 1951, and "Panogen" (1.5% mercury) at 2 oz. per bu. in 1952. Sowing rate was on a basis of 900 viable seeds per 15-foot row, or

approximately three pecks per acre. Data reported and conclusions presented are for seed yield only.

Differences among varieties reached statistical significance in all but one of the ten experiments. Treatment differences exceeded the 1 percent level of probability in only four experiments but treatment means were in favor of "Ceresan M" in seven of the ten tests. "Panogen"-treated plots were significantly better than "Ceresan"-treated plots in only one experiment. Treated plots were significantly higher yielding than non-treated plots in seven of the ten tests.

The average acre yields associated with "Ceresan" and "Panogen" seed treatment for the ten varieties in ten tests at five Iowa locations, 1950-52, are given in Table 1.

"Panogen" did not prove superior to the "Ceresan M" treatment during the three-year period and probably was somewhat less effective in increasing yields. Application rates used in these experiments make "Panogen" more expensive than the "Ceresan M" treatment. Other experiments indicate that "Panogen" can be equal to the "Ceresan M" treatment if the dosage is increased, but a corresponding increase in cost results. The percentage yield increase from both treatments in comparison with the non-treated plots was sufficient to justify treatment.

Differential response of varieties to seed treatment was apparent. Greatest increase in yield was exhibited by the yellow seeded variety Minerva, with Koto giving next greatest response. The new Redwood variety returned a good yield increase from both treatments. The early maturing varieties Marine and Redwing gave the smallest increases from treatment.

Average yields from the treated and non-treated plots for each of the three seasons are shown in Table 2

Plots treated with "Ceresan M" yielded somewhat more than 'Panogen" treated plots in 1950 and 1952, while both had identical average yields in 1951. Average percentage increase of treated versus non-treated plots was of similar magnitude for the three seasons.

Seed Treatments

JACK P. Meiners reports results of seed treatment tests to control head smut caused by the fungus *Ustilago buttata* on mountain brome, conducted by the Washington Agricultural Experiment Stations and the U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering at Pullman, Washington, in 1952. Seed of the variety Bromar was inoculated with a new, virulent strain of the fungus

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This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is connected with the Division of Insect Detection and Identification, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

By Kelvin Dorward

ALTHOUGH the insect season was on the decline during September, several insects were still causing concern. Grasshoppers were causing damage and were on the increase in several areas. In Idaho, threatening infestations were on between 8,000-10,000 acres in Idaho County. In Washington County between 8,000-10,000 acres of crop land was infested or threatened and about 6,000 had been treated to protect the alfalfa seed crop. Damage to crops was reported from Gooding, Jerome and Twin Falls Counties. Hoppers were abundant enough in several areas of Utah to cause damages and continued to be a problem in areas of New Mexico during the early part of the month. Damage to crops, pastures and gardens continued throughout Missouri. These insects were also a problem in southern Wisconsin, damaging corn and soybeans.

The annual adult grasshopper survey conducted by the Grasshopper Control Project is currently underway in several of the states. This survey together with the grasshopper egg survey will provide the basis for the information for expected 1954 grasshopper infestations. This release will be available early next year.

The corn earworm, one of our most universal economic pests, was infesting crops in many sections of the United States during September. In Massachusetts it began its attack much earlier than last year. Maryland canning corn was heavily infested, with some fields having 98 percent of the ears infested. Corn and peanuts were damaged in several eastern North Carolina counties. Soybeans were being attacked by the insect in Henry County, Georgia as were peanuts in Ben Hill and Irwin Counties. In Union County, heavy infestations were in sweet corn. Both sweet and field corn in the southern half of Wisconsin had unusually abundant populations. In Illinois, untreated sweet corn was 100 percent infested and populations were nearly as high in late field corn. Sorghum heads were heavily infested in southwest Missouri and damage to soybeans and tomatoes throughout the State was increasing.

Many fields of broom corn in Oklahoma were heavily infested but light populations were on sorghum in Potter and Carson Counties, Texas. Severe infestations were in Kane County, Utah. During August heavy infestation, 98 percent, was in sweet corn in the Hermiston, Oregon area. Sixty-eight percent infestation was reported from the Milton-Freewater section and the insects were recorded as being abundant in eastern Oregon.

The velvetbean caterpillar caused considerable damage to peanuts in some Jefferson County, Florida fields. In August a general infestation was reported from the Homestead area. Damage also oc-

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curred to soybeans in Spalding, Henry, Dougherty, and Treutlen Counties, Georgia; to velvet beans in Coffee County and to peanuts in Ben Hill and Irwing Counties.

Other important cereal and forage insects during September included the fall armyworm which was reported from Arizona, Kansas, Oklahoma, Missouri, Tennessee, Georgia, South Carolina, and Wisconsin. The alfalfa caterpillar was very abundant in Arizona fields of alfalfa and numerous in several Utah areas. The insect was unusually abundant in alfalfa in Illinois and extensive moth flights occurred. Large numbers of adults were present in central and western Oklahoma areas and larvae were causing some damage.

The first fall reports on the greenbug have been received. In Texas, light local infestations were observed on grain sorghums in Kent County while in central Oklahoma the insect was observed on volunteer small grains.

Truck Crop Insects

THE tomato russet mite which last year was found for the first time in New Jersey and Pennsylvania and reported last month for the first time in Delaware and Maryland has caused rather severe damage in various midwestern and eastern states. An extensive survey was conducted in Pennsylvania and the pest was found to be rather widely distributed. In Juniata County, infestation was found in several fields, but was mostly under control. The same was true in York County. Damage occurred in Columbia, Carbon and Schuylkill Counties and the mite was found to be in Lebanon, Snyder, Lackawanna, Luzerne, Lancaster, Berks, Chester, Lehigh and Franklin Counties. Practically all fields in the commercial tomato areas of Illinois were infested and some were practically destroyed. Most reports from the various states indicated that the infestations were on plants imported into the respective states. The Luzerne County, Pennsylvania infestation originated from locally grown greenhouse plants.

The lesser cornstalk borer caused damage during the month in several widely scattered states. Beans were damaged in Arizona, Mississippi, Missouri, and Virginia. Stands of cowpeas and snap beans were reduced 50 percent or more on Eastern Shore of Virginia. In the northwestern area of Texas widespread infestations destroyed many fields of black-eyed peas. In Washington County, Georgia cowpeas were heavily damaged. The insect was extremely severe on grain sorghums in the coastal area of South Carolina. Soybeans were severly damaged in the Florence County area.

Mexican bean beetles were active and required insecticides in fall snap beans in Gadsden County, Florida. Heavy infestations of the insect were on beans and cowpeas in Union County, Georgia. Adult beetles were abundant on snap beans in the Charleston, South Carolina area and moderate numbers were around Norfolk, Virginia. Beans were damaged in several areas of Delaware, but in Massachusetts, the pest was generally less abundant than normal.

Stored Grain Pests

STORED grain pests were causing considerable concern in many states. In Missouri the Indian meal moth continued to damage farm-stored wheat over most of the State. This problem first became of concern during August. The insect was also damaging stored wheat in Kansas. The Angoumois grain moth was damaging oats in storage in Jackson County, Mississippi and farm-stored wheat and corn in eastern Kansas counties. In Ohio the Mediterranean flour moth was severely infesting wheat in a number of farm granaries in the northern part of the State. In Oklahoma, farm-stored wheat was being heavily damaged by several pests, particularly the rice weevil, the Indian meal moth and the meal moth, *Pyralis farinalis*. In North Carolina there has been a rapid increase of stored grain insect populations in farm storage bins.★★

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Fertilizer Swindlers Active

Itinerant peddlers, using high-pressure methods to sell fake fertilizer in the New York suburban areas were once more being sought by law enforcement authorities early in the fall season.

"Fertilizer" composed of crushed tea leaves and New Jersey swamp mud, is being peddled, usually by a team of two men. The racket is operated by one of the men engaging the prospect in conversation while the other proceeds to cover the lawn with a layer of the phoney stuff. Payment is then demanded and the timid owner, usually a housewife, will pay.

Detective Thomas F. Stiles, New York City, has been investigating this type of swindle since 1947. He says that the peddlers usually drive a one-and-a-half-ton truck and spend about $3.50 to $5 for their load of hodgepodge and swamp mud. They then proceed to cheat the unsuspecting housewife not only by giving short count in bushel size, but by charging an exorbitant price.

According to detective Stiles, some persons have been known to pay up to $85 for the privilege of having their lawns covered with useless material. He estimates that about 20 trucks move into the Borough of Queens each season and each trucker makes from 30 to 50 stops per day. They try to hit the houses after the husband has left for work, it being easier, generally, to intimidate a housewife.

•

New BHC Process Used

A unit to produce BHC is included in a $10 million development program now under way by Pennsylvania Salt Mfg. Co., Philadelphia. The new unit will be at Calvert City Ky., in connection with the company's recently opened chlorine and caustic soda plant.

The BHC unit will employ a continuous process developed by the company's research and development division, to produce a higher gamma concentrate product. The new process not only is more efficient than former ones, but is expected to produce a technical grade more economical and versatile in blending.

Production is expected to be under way early in 1954, in time for next season's deliveries.

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WASHINGTON *Report*

by

Donald G. Lerch, Jr.

Cornwell, Inc., Washington, D. C.

A POSITIVE program in the field of herbicides is being launched by the National Agricultural Chemicals Association. The new program was approved by the board of directors during the recent 20th annual meeting at Spring Lake, New Jersey.

Object of this new work is to make available to all interested groups more facts about herbicides and their place in crop production, grassland agriculture and industrial uses. (Including maintenance of right of ways.) Research data already accumulated shows a tremendous potential market in these fields.

Because of the scope of the undertaking, a full time man will be assigned to this responsibility. He is expected to be appointed shortly.

The herbicide specialist will cooperate with groups and organizations such as the USDA, agricultural experiment stations, weed control conferences, national and state farm organizations and others.

Part of the work will be research aimed at assembling data from all sources. This information will then be made available to others through meetings and by other means.

The increased use of herbicides in accordance with the manufacturers recommendations can be of great help to farmers in reducing the cost of production by cutting the cash outlay for labor and increasing yields through improved weed control. Some specialists believe that as the use of herbicides expands, several agricultural crops will find increased markets because of lower cost production.

Agricultural leaders have great hopes for the fuller contribution to agriculture that herbicides can make. They see every reason to believe that manufacturers can expect an increasing demand by farmers.

* * * *

Leading entomologists, representatives of the pesticide industry and the USDA are joining together to gain wider recognition of the importance of insect control during a special observance next year. The occasion is the centennial of professional entomology.

The first entomologist appointed by the Federal Government was Townsend Glover who accepted a position in the U. S. Patent Office on June 14, 1854. Consequently, the climax of the centennial observance is set for June 14th at a banquet to be held in Washington during which, top officials and scientists in government and industry will participate.

First state entomologist was Dr. Asa Fitch, who served in New York, beginning his career in May 1854. Since this time, entomology has become a recognized department in agricultural colleges and experiment stations throughout the nation.

General chairman of the observance is David G. Hall, representing both the Entomological Society of America and the Bureau of Entomology and Plant Quarantine. Others appointed to the supervisory committee are: Dr. Bailey B. Pepper, representing experiment stations; Dr. L. A. Stearns representing State-Federal extension service; W. S. Moreland representing universities and colleges; M. R. Budd, appointed by NAC to represent industry; and Dr. G. H. Bradley representing the U. S. Public Health Service.

Assistant Secretary of Agriculture, J. Earl Coke, speaking at Spring Lake, New Jersey, called on the industry, "to join with us in celebrating this important milestone in the nation's progress in the great field of entomology".

* * * *

Because of extreme importance of entomology to agriculture and the long association of the USDA in this field, the Department was requested by the profession to develop suitable plans to commemorate the event. Secretary Benson accepted this opportunity and requested BEPQ to assume leadership of the observance for the Department.

A general plan has been discussed and agreed upon in principle by industry and the profession. Chairmen for the three major phases of the plan have been appointed and are at work. These sections are: Public Relations, Education and Business.

It is expected that during next May and June, there will be a series of advertisements in national magazines and newspapers depicting the progress made in this field and the many problems awaiting solution. The same type of story will be carried on radio and television programs. Many addresses will be made before key groups and young people.

A commemorative stamp is planned for issuance at this time. The various research laboratories throughout the nation will hold "open houses" for scientists and the public. Special movies will be shown at meetings and in theatres.

The success of this undertaking depends on the cooperation and work of all groups concerned. Few people know that insects cost the economy of the country at least 4 billion dollars annually or that these pests nullify the labor of a million working men each year. More to the point, people do not know that solution of the insect problem rests squarely upon their own shoulders.

Through this observance, the profession, industry and the public can benefit through a wider recognition of the importance of insect control to the health and welfare of the nation.

* * * *

Fertilizer industry association leaders are meeting with government

officials and state and county farm leaders to emphasize the importance of fertilizers in reducing the cost of production. They are including other sound land practices in their presentations.

High level USDA discussions with officials stress the importance of fertilizers regardless of the acreage planted to various crops. These talks are expected to set the tone for a series of meetings in many states where the economies of fertilizer usage and profit are presented to farmers in accordance with community conditions.

One of the first such state meetings was recently held at the Virginia Polytechnic Institute at Blacksburg, Virginia. Industry, college and farm leaders along with dealers, representatives of banking groups developed plans for promoting the more effective use of fertilizers, seed and lime. Many of those attending are optimistic over the success of the program among farmers.

Other state meetings are scheduled. While each state has its own way of doing things, some of these same points will probably be covered.

These meetings are:

October 7—University of Kentucky
October 20-21—New England meeting at Norwich, Conn.
October 22 University of Arkansas
November 4-5-6 — Mississippi State College at Biloxi
December 2 — North Dakota State College
December 4 — South Dakota State College
December 7 — University of Minnesota
December 11-12—Kansas State College
December 15-16 — Michigan State College
January 7-8, 1954 — Texas A & M
January 25-27 — Pennsylvania State College
January 26-27 — Iowa State College
Early February—University of Wisconsin

* * * *

Top management in fertilizer and pesticide sales and production planning have a stake in two big decisions pending in the U. S. Department of Agriculture. One concerns possible cutbacks in corn acreage for 1954. The other hinges on what to do with land taken out of crops under control.

The Department's grain branch is recommending allotments to the policy-making officals. Branch men are convinced that allotments are necessary despite the drop in the 1953 crop estimate. They are concerned primarily with price and storage, both of which would be unmanageable if farmers are given another year to plant for maximum harvests.

Corn prices are already depressed by the 800 million bushel carry-over of old corn plus the 3.2 billion bushel crop expected this year. With farm prices now sinking below government loan rates, another bumper crop would make effective price support nearly impossible, they feel.

Storage is at a premium now. Despite government efforts to touch off a wave of farm storage building, little is reported being built when compared to the size of the corn crop. USDA men see no big increase in consumption either at home or abroad during the next 12 months. They believe some corn will be "begging" for storage even with special government programs to help meet emergency conditions.

* * * *

Policy-making officials are weighing the political advantage of cutting corn acreage with a hoped-for price strengthening versus the resulting resentment among farmers who dislike production controls. If the decision is postponed until next year, then the administration faces a depressed corn market when farmers go to the polls.

The decision on free land is part of the aftermath of production controls. Wheat acreage is already restricted by recent national referendum approved by the highest percentage of voting wheat farmers in history. If cotton and corn allotments follow, it is estimated that over 30 million acres would be "free". USDA men say the allotments could in effect be nullified depending on what farmers plant on this land. Instead of three big surplus problems, there could be a dozen smaller ones.

Consequently, the State and County Production and Marketing Committees and the state extension services will be advising farmers what to plant on this "free land". The kinds of crops planted may well have a direct effect on both fertilizer and pesticide sales. As it stands now, the government's objective will be to steer farmers away from cash crops on this land. Farmers, on the other hand, will be looking for the greatest dollar return possible. Fertilizer and pesticide requirements and expected return on investment will undoubtedly influence their decision.

Part of the 2 million dollars additional research money granted the USDA during the current fiscal year is being used for the development of new chemicals for selective weed control. Part of the remaining funds are being allocated for research on rusts and smut that attack grain and sorghums.

Work is being speeded on studies to retain flavor and freshness of fruits and vegetables from farm to consumer. Flavor is receiving special attention.

This 2 million dollar increase represents about one eighth of the funds requested for additional research by the major farm organizations and commodity groups. Several spokesmen for these groups believe that further increases are possible when Congress convenes next year. They base their optimism on an increase this year in the face of general reductions in appropriations, plus the continued emphasis of President Eisenhower and Secretary Benson that research and education are the two cornerstones of a sound farm program.

•

Gallowhur Names Gavin

T. Edward Gavin has been named sales manager of Gallowhur Chemical Corp., New York, the company has announced. Mr. Gavin was formerly assistant industrial department manager of B. T. Babbitt, Inc.

In his new position, Mr. Gavin will direct sale of all Gallowhur products including "Puratized" brand fungicides, "Puraturf" herbicides, "Skil" emulsifiers, "Purasan" quaternary ammonium compounds, detergents for agriculture and industry and pharmaceuticals.

He is a graduate of St. Peters College and has taken graduate work at Stevens Institute of Technology.

•

Rutland Leaves I.M.C.

John W. Rutland, general manager of International Minerals & Chemical Corp., Chicago, recently resigned his position in order to devote more time to his own fertilizer business in Waynesville, N. C.

Time for TOXIMUL!

Month in and month out, it's always time to buy TOXIMUL —if you want formulations of the highest effectiveness at the lowest cost!

Plants throughout the country are rapidly making TOXIMULS first choice as an emulsifying agent for all liquid formulations, because of their versatility, efficiency and economy. Ninol has led the way, with these fine products, in developing new anionic-nonionic blends to provide new highs in *flash dispersibility* and *emulsion stability* in all waters. This means better production, more satisfied users of your product—and yet you actually show a saving on costs!

It will pay you to investigate the TOXIMUL emulsifiers —there's one especially suited to your formulation. Write now for samples and bulletins—or if you have a unique problem, we will be happy to develop a special TOXIMUL to fit your needs.

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DETERGENTS
EMULSIFIERS
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1719 S. CLINTON • CHICAGO 16 • PHONE CHESAPEAKE 3-9625

In Canada: Chemical Developments of Canada Ltd., 420 Lagauchetiere Street W., Montreal 1, Quebec

SEND THIS COUPON NOW!

NINOL LABORATORIES, INC., DEPT. A,
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Gentlemen:

Please send working samples and Technical Bulletins describing:

- ☐ *TOXIMUL* 150 (for use with Toxaphene, 4 lb. Chlordane, Heptachlor)
- ☐ *TOXIMUL* 250 (for use with Chloro 1PC, Pentachlorphenol)
- ☐ *TOXIMUL* 300 (for use with DDT, 2-4D, 8 lb. Chlordane)
- ☐ *TOXIMUL* 400 (for use with BHC, Lindane, 2-4-5T)
- ☐ *TOXIMULS* (for use with other pesticides)

Signed _____

Co. _____

Street _____

City & State _____

Suppliers' BULLETINS

Beckman Issues Bulletin

A new bulletin describing its line of scientific equipment has been issued by Beckman Instruments, Inc., South Pasadena, California. Included in the illustrated listings are various pH meters; spectrophotometers; Geiger counters and other special instruments for chemical laboratories. Write for Bulletin #300, in care of the company.

•

"Darvan" Booklet Offered

Technical information on the application of "Darvan Dispersing Agents" for use of finely divided solids or liquids in water has been condensed by R. T. Vanderbilt Co. into a four-page booklet complete with charts, photographs and instructions.

The new booklet describes the use of "Darvans" in the preparation of insecticides and other products. Complete information is included on the action, use, and advantages of these agents. The booklet, Bulletin No. 13, is available on request from the R. T. Vanderbilt Company Specialties Department, 230 Park Avenue, New York 17, N. Y.

•

IMC Film Announced

"Up From The Bed of a Desert Sea"—is the title of a 16 mm., color, sound film which tells the story of the mining and refining of muriate of potash, sulfate of potash, and "Sul-Po-Mag" from ore face to finished product. Produced by the staff of the Potash Division of International Minerals & Chemical Corporation at their desert plant near Carlsbad, New Mexico, the film takes the viewer on a picture tour of the mining operation 900 feet beneath the surface of the desert and a visit to the modern potash refinery on the desert floor.

Running time is 27 minutes. Interested business, professional or educational groups may arrange to borrow the film by writing to:

Potash Division, International Minerals & Chemical Corporation, 20 North Wacker Drive, Chicago 6, Illinois, the company says.

•

Hypro Describes New Pump

Hypro Engineering, Inc., Minnepolis, Minn. has announced a new industrial pump with scoop rotor and rubber roller-type vanes, for use where continuous water recirculation is required.

Designated as model 4300, the unit is engineered for continuous duty service through the use of sealed, permanently-lubricated ball bearings. An additional feature is a pressed fit of the stainless steel shaft into the inner ball bearing race to restrict lateral movement of the rotor, minimizing end thrust wear within the pump.

The Hypro Model 4300 pump impeller is self-lubricated by water and will deliver approximately 7 gals. per minute at 50 lbs. pressure and 1750 R.P.M., the makers say. Pressure range is from 0 to 75 psi. The new pump is furnished with ¾" ports, recommended speeds to 1800 R.P.M. Weight is 4½ lbs. net.

For literature and price information on the new Hypro Model 4300, write Dept. KP, Hypro Engineering, Inc., 404 No. Washington Ave., Minneapolis 1, Minn.

•

Pulverizer is Described

Schutz-O'Neill Co., Minneapolis, has issued a new bulletin describing its new "Superfine Pulverizer" which is described as a "Centrifugal air attrition impact pulverizer and classifier in a single unit."

The four-page bulletin presents cut-away drawings of the equipment, photos, and schematic drawings of the pulverizers. Features of the mills include accurate grinding control, temperature control, easy cleaning, adjusting and repairing and wide adaptability. The machines are useful in the manufacture of insecticides, fungicides, fertilizers and other chemical products, the makers state. Write Schutz-O'Neill Co., 311 Portland Ave., Minneapolis, 15, Minn.

•

CSC Issues New Folder

A new technical bulletin covering its industrial chemicals and market development products, has been issued by Commercial Solvents Corp., 260 Madison Ave., New York. The folder presents technical information on a large group of compounds.

•

Conveyor Belt Bulletin Out

Barber-Greene Co. has issued a new catalog describing their line of belt conveyors. The booklet illustrates and describes each component of the equipment with line drawings showing the relationship of the unit to the entire conveyor. In addition, the range of application of each unit is tabulated for quick reference.

Among accessories listed are feeders, hoppers, conveyor supports, backstops and brakes, walkways, housings, belt cleaners, spouts, hoods, etc. A section on shuttle conveyors and stackers illustrates several economical

stockpiling systems made possible through the use of this type of conveyors.

Write for catalog 76A, "Barber-Greene Conveyors," to the company, 400 N. Highland Ave., Aurora, Ill.

•

1952 Bibliography Offered

Alrose Chemical Co., Providence, R. I., has issued its 1952 bibliography on "Sequestrene" (ethylenediamine tetraacetic acid). The bibliography covers 1952 literature as well as a number of earlier papers not included in earlier publications. More than 450 references are listed. The bibliography is available from the company, Box 1294, Providence 1, R. I.

•

Minor Element Bibliography

A bibliography of references to the Literature on the minor elements has been published by the Chilean Nitrate Educational Bureau. The work is entitled "Volume III of the Fourth Edition of the Bibliography of References to the Literature on the Minor Elements and Their Relation to Plant and Animal Nutrition."

Previous editions were published as follows: First, 1935; Second, 1936; and Third, 1939. The 1st Supplement to the Third Edition appeared in 1940. Volume I of the Fourth Edition, comprising all of the material in the Third Edition and seven Supplements, and complete to June 30, 1947, was published in 1948. It included 10,000 abstracts, covering 206 crops, 45 elements, and 4,463 authors. Complete indices were provided, i.e., Author, Element, General Nutrition and Botanical.

Volume II contained 1,222 abstracts published in scientific journals from July, 1947 to December 1950. It included 141 crops, 45 elements, and about 1,300 authors and co-authors.

Volume III, 13th publication in this series, contains 1,000 abstracts, published from January 1951 to December 1952, representing 1,249 authors and co-authors and covering 45 elements. Complete indices are provided. For a copy write to Chilean Nitrate Educational Bureau, Inc., 120 Broadway, New York 5, New York.

•

New Emulsifier Bulletin

The Emulsol Corporation, Chicago, has issued Technical Bulletin No. 38 to bring up to date information regarding "Emcol H-50A," an aliphatic hydrocarbon emulsifier designed for emulsion degreasing, fuel oil desludging, agricultural spray oils and other applications. Copies are available from Emulsol sales representatives, or the home office 59 E. Madison St., Chicago, upon request.

•

CFA Handbook Issued

A 160-page "Western Fertilizer Handbook" has been issued by the California Fertilizer Association's Soil Improvement Committee. Priced at one dollar per copy, the book offers valuable information to anyone working with agriculture. Fundamental facts are given, covering soil and water, irrigation, reaction of soil to various plant foods, the role of calcium, magnesium and sodium, nitrogen conversion and definitions of types of soils.

Other chapters deal with organics versus inorganics; cellular structure of plants; plant food elements; diagnostic tests for soil and crop problems and soil testing.

Commercial fertilizers and agricultural minerals are discussed, with explanatory material covering both dry and liquid fertilizers.

The use of fertilizers is described in another chapter. It covers placement and methods of application, starter solutions, application equipment, water, drill, air and spray application, and secondary and minor element deficiency correction.

Also of value is a digest of western fertilizer laws, a history of the California Fertilizer Association, and a final chapter on the economic importance of fertilizers. A glossary is provided to define terms, and useful measures are given; for instance, a quick conversion of gallons into pounds; calculating amounts of fertilizer per 100 feet of row for various rates of application and square measure to convert feet into acres and how to apply such information to application rates.

The book is available from the California Fertilizer Association, 475 Huntington Drive, San Marino 9, California. The price is $1.

•

Offers Potash Leaflet

A new leaflet describing methods of improving crop yield and combatting soil depletion through the use of potash is now available from American Potash & Chemical Corporation, Los Angeles.

The leaflet, one of a series called "Profit Plugs for Progressive Growers," may be obtained by addressing a request to American Potash & Chemical Corporation, 3030 West Sixth Street, Los Angeles 54, California.

Based on researches by recognized agricultural authorities, the leaflet details symptoms of "potash hunger" and describes the most effective treatment for vegetable crops, fruit crops and forage and pasture fields.

•

Diluent Literature Available

Increases in efficiency, effectiveness and economy of agricultural dusts and sprays are discussed in a new R. T. Vanderbilt Co. technical bulletin on diluents, dispersing agents and stickers. The illustrated 8-page brochure is a condensation of the latest technical information on "Pyrax ABB," a low absorbtion diluent for extending dust concentrates; "Continental Clay," a diluent for high bulk dusts and wettable concentrates; "Darvan," a dispersing agent for wettable powders; and "Veegum," a sticker and emulsifier.

The new booklet describes the composition, action and use of each of these products. Specifications and a general discussion of agricultural dust formulation are also included.

The booklet, "Bulletin No. 23, is available on request from the R. T. Vanderbilt Company Specialties Department, 230 Park Avenue, New York 17, N. Y.

EVER MEET

face-to-face?

BORON-HUNGRY CROPS NEED

TRONABOR*

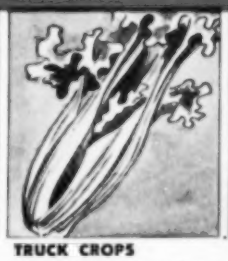
(Agricultural Pentahydrate Borax)

You're looking at Boron-hungry Alfalfa, typical of many important crops which require more adequate supplies of Boron than they can get from the soil. Such crops need TRONABOR—a low cost source of Boron produced specifically for the needs of Agriculture. TRONABOR is a granular free-flowing product containing a guaranteed minimum of 44% B_2O_3 corresponding to 13.7% Boron and 121% equivalent Borax. It is packaged in 100 pound bags and is easy to apply either in dry or liquid* form. Boron-deficient crops cost you money! Your small investment in TRONABOR will pay off in bigger yields, more marketable crops, more profit for you at the market. Investigate this economical and effective source of Boron for soil application, today.

MORE MONEY PER YIELD WITH TRONABOR

ALFALFA

TRONABOR provides greater Alfalfa yield per acre. Better quality hay. Prevents "Yellow-top," puny, stunted leaves. Plants grow lush and strong.



TRUCK CROPS

TRONABOR produces better yield, more marketable produce. Prevents cracked stems in Celery, unsightly black spots in Table Beets, hollow stems and darkened heads in Cauliflower.

TREE FRUIT

There's more money in TRONABOR-FED apples at harvest time. Fruit grow large and firm. TRONABOR prevents pitting of the surface, results in better grading.

TRONA
INDUSTRIAL AND AGRICULTURAL CHEMICALS
ESTON CHEMICALS

*Trade Mark Registered

See your local fertilizer dealer for information on TRONABOR, or write American Potash & Chemical Corporation, one of the world's principal producers of Boron derivatives.

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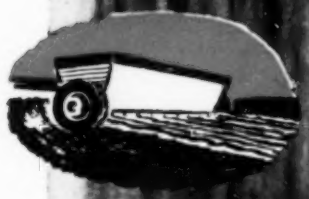
DAVISON

GRANULATED SUPERPHOSPHATE offers 3 way Control

1. STORAGE CONTROL—will not cake or lump while in storage.



2. APPLICATION CONTROL—drills free and even . . . does not bridge over in the drill.

3. FOOD CONTROL—supplies uniform amount of plant food at desirable rates.

Davison's Granulated Superphosphate with 3-way control can mean added sales for you!

No longer is it necessary for you or the farmer to worry about lumping or caking . . . Davison's Granulated Superphosphate will store without becoming hard or caked. And when the farmer starts to apply Granulated Superphosphate in the field he will find there is no dusting nor will it bridge over in the drill. Granulated Superphosphate drills freely and evenly giving complete coverage. Because of the granular structure, plant food is released at desirable rates.

For added sales points be sure to get *Davison's Granulated Superphosphate with the 3-way control!*

Progress Through Chemistry

THE DAVISON CHEMICAL CORPORATION

Baltimore 3, Maryland

PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS, SILICOFLUORIDES AND FERTILIZERS.

COLUMBIA-SOUTHERN

BHC

Benzene Hexachloride . . . for manufacturing use only

are you keeping your eyes on new developments in **BHC** and **CHLORO-IPC?**

COLUMBIA-SOUTHERN

CHLORO-IPC

Isopropyl N (3-Chlorophenyl) Carbamate . . . for manufacturing use only

ARE YOU CAPITALIZING ON THE USES FOR BHC?

The many uses already established for BHC, and further uses now under test, open vast new markets and profit opportunities to manufacturers of BHC dust or spray concentrates.

1. SPITTLEBUGS IN FIELD CROPS. Experiments have shown that in combating spittlebugs, BHC has increased the yield of field legumes. BHC's speed of kill reduces plant injury from bugs, leafhoppers and thrips. Early spring treatment is normally prescribed.

2. AMBROSIA BEETLES IN LOGS AND LUMBER. When these pests burrow under the bark, various stains frequently develop in the wood. Because of BHC's speed of kill, a promising market exists in uncut timber or cut logs. Spray treatment is normally recommended.

3. SPRAY FORMULATIONS. There is a steadily increasing use of liquid emulsifiable concentrates which employ Columbia-Southern's 40% technical BHC for higher concentrations and greater stability.

4. NURSERIES. Experiments show great acceleration in the rate of sapling growth when BHC is added to the soil.

5. HIGH CONCENTRATE DUST BASES WITH HI-SIL. BHC permits dust bases as high as 36% gamma which afford great reductions in shipping and packaging costs. Hi-Sil, another Columbia-Southern product, is widely used in making 75% DDT.

6. ANIMAL ECTOPARASITES. Better control over cattle lice is made possible by both BHC dust and sprays which kill the eggs as well as the adult lice. The growing cattle market indicates a growing BHC market. Outstanding control has been shown for hog mange mite with BHC dust or sprays.

ARE YOU CAPITALIZING ON THESE USES FOR CHLORO-IPC?

Columbia-Southern pioneered in the development and field testing of Chloro-IPC and was first to serve agriculture with this promising herbicide ingredient. During 1953, the first year of unlimited use, every grower reported uniformly excellent results regardless of weather.

1. COTTON Extensive use shows that spray applications of Chloro-IPC can reduce by as much as 75% the labor of hoeing.

2. FIELD LEGUMES. Outstanding weed control has been reported in Middle Atlantic states through the application of 2 to 3 lbs. of Chloro-IPC in mid-winter on alfalfa plantings.

3. EXTENDING POTATO DORMANCY. In U.S. and abroad, Chloro-IPC applications show a highly significant extension of the dormant period in potatoes. Spring sprouting and shrivelling are retarded in stored table stocks.

4. VEGETABLES. Tests show promising results on certain leafy vegetables along the Eastern Seaboard in controlling a wide variety of annual weeds. As little as 4 pound per acre has proved effective under certain conditions.

5. SEED GRASSES. Fall treatments of Chloro-IPC for annual weeds in alta fescue show excellent promise, particularly in the Pacific Northwest.

6. NURSERIES. Chloro-IPC soil applications are reported to permit great increases in sapling growth. This opens a new market.

A copy of our summary giving results of field testing is available upon request. Additional information concerning field and crop residues also can be furnished.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

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Readership Survey

shows

AGRICULTURAL CHEMICALS

far out in the lead in both coverage and reader interest among manufacturers, mixers, dealers and distributors of agricultural insecticides, fungicides, fertilizers, herbicides, etc.

A survey just concluded by a well-known New York City advertising agency (name on request) shows that AGRICULTURAL CHEMICALS is read regularly and found most helpful by 54% of those reporting their readership preferences. (Over fifty publications were mentioned in all the responses, so mention of one publication by over half the responders constitutes a rather remarkable showing.) The record for the five leading publications follows:

	mentioned by	% of total
Agricultural Chemicals	89	54
Commercial Fertilizer	44	27
Farm Chemicals	41	25
Jrnl. Ag. & Food Chem.	28	17
Chemical Week	28	17

A second comparison was made based on ratings given various publications for the order of their selection (first place, 6 points, 2nd, 5 points, 3rd, 4 points, any mention, 1 point). Again AGRICULTURAL CHEMICALS topped the field by an even wider margin.

Agricultural Chemicals	454 points
Commercial Fertilizer	223 "
Farm Chemicals	170 "
Chemical Week	134 "
Jrnl. Ag. & Food Chem.	127 "

A third comparison was made, relating number of mentions to advertising page rate. AGRICULTURAL CHEMICALS again headed the list with the lowest cost per response.

Agricultural Chemicals	$1.58 per response
Commercial Fertilizer	2.05 "
Farm Chemicals	2.20 "
Jrnl. Ag. & Food Chem.	8.93 "
Oil Paint & Drug Reporter	9.00 "
Chemical Week	15.18 "

We will be happy to supply a copy of the complete report. It would seem to indicate that AGRICULTURAL CHEMICALS is — by a wide margin — the best read publication in the field — and considered by readers to be the most helpful in serving them. Equally obvious then is it that AGRICULTURAL CHEMICALS is the number 1 publication for advertising to manufacturers, mixers, dealers and distributors of agricultural insecticides, fungicides, fertilizers and herbicides — and the only publication which actually covers the field adequately. And, of the top four publications mentioned, it is the only one which is a member of the Audit Bureau of Circulations, and whose circulation claims are subject to actual verification.

AGRICULTURAL CHEMICALS

175 5th Ave. **New York 10, N. Y.**

MEMBER AUDIT BUREAU OF CIRCULATIONS

For better wettable powders

USE

IGEPON

to help fight farm pests

IGEPON T-77

IGEPON T-73

IGEPON AP-78

IGEPON T-77, T-73 and AP-78 are particularly recommended for the formulation of dry mixtures of wettable biocidal powders because they can be ground in without objectionable caking and also because they give your products the added advantage of—

Faster Wetting Out • Stable Dispersion • Controlled Foaming

in either hard or soft water. Let us recommend the IGEPON which is best suited to your particular requirement.

IGEPONS can be used in herbicides and insecticides including 2,4-D, DDT, BHC, Lindane, Chlordane, Dieldrin, IPC, Potassium Cynate, Parathion, Aldrin and Sulfur.

You can do it better with an IGEPON

Write today for our new brochure on the complete IGEPON line.

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DIVISION OF GENERAL DYESTUFF CORPORATION

435 HUDSON STREET, NEW YORK 14, N. Y.

gdc ANTARA

SALES OFFICES: New York • Boston • Providence • Philadelphia • Charlotte, N.C. • Chicago • Portland, Ore. • San Francisco

One-Stop NITROGEN Service For Fertilizer Manufacturers

LION

Nitrogen

FERTILIZER MATERIALS

LION ANHYDROUS AMMONIA—For formulation. A uniformly high-quality basic product. Nitrogen content, 82.25%.

LION AQUA AMMONIA—For formulation or acid oxidation. Ammonia content about 30%. Other grades to suit you.

LION AMMONIUM NITRATE FERTILIZER—For direct application or formulation. Improved spherical pellets. Guaranteed 33.5% nitrogen.

LION NITROGEN FERTILIZER SOLUTIONS—For formulation. Three types to suit varying weather and manufacturing conditions.

LION SULPHATE OF AMMONIA—For direct application or formulation. Large free-flowing crystals. Guaranteed nitrogen content, 21%.

TECHNICAL SERVICE—Lion provides special technical assistance for fertilizer manufacturers. Write to CHEMICAL SALES DIVISION for quick service.

LION OIL COMPANY

EL DORADO, ARKANSAS

INDUSTRY News

F. U. Rapp, Hercules, Dies

FRANK U. RAPP

Frank U. Rapp, 46, sales manager of agricultural chemicals for Hercules Powder Co., Wilmington, Del., died at his home of a heart attack, Sept. 29. He had been with Hercules since 1928, when he joined the firm as a chemist at the firm's experimental station at Kenvil, N. J. Mr. Rapp was graduated in 1928 from Pennsylvania State College as a chemical engineer. In 1929, he was transferred to the naval stores department as a salesmen, and had been with the department since. Later he was named head of the Charlotte, N.C. office, and in April, 1952 was appointed sales manager of agricultural chemicals.

Mr. Rapp is survived by his wife, Edna Reynolds Rapp, and a daughter, Jane Anne, who is a student at Pennsylvania State College. Also a brother and three sisters survive.

Withdraws Bankruptcy Petition

Petition of Denver Amarillo Express to have Chemical Corporation of Colorado, Denver, declared bankrupt, has been withdrawn. At a hearing held August 31 in the U. S. district Court for the District of Colorado in Bankruptcy, B. C. Hilliard Jr., referee in bankruptcy, granted the express company permission to withdraw its petition, and directed further that the debtor make no further payments on notes given by it to creditors, but rather that such sums be paid to the referee. Objections had been made by certain creditors to claims filed against the company.

•

Dr. Taylor to New Post

Dr. John R. ("Dugan") Taylor, Jr., agronomist for the American Plant Food Council since 1946, has resigned, effective October 15, to become sales manager of the Grand River Chemical Division of Deere and Company, Tulsa, Oklahoma. The announcement was made by L. A. Rowland, vice-president of Deere & Company and general manager of the Chemical Division. This Division of Deere & Company was formed when the company expanded into the fertilizer and chemical field.

Paul T. Truitt, president of the Council, said that "we regret to loose the services of Dr. Taylor who has contributed so much to developing the Council's program and activities."

Dr. Taylor is a native of Buffalo, Alabama, received his B.S. degree in agriculture at the Alabama

DR. JOHN R. TAYLOR, JR.

Polytechnic Institute in 1929; his M.S. degree in agronomy at West Virginia University in 1935, and his Ph. D. degree in soil chemistry at the University of Wisconsin in 1937.

From 1938 to 1946, Dr. Taylor was active in the fertilizer division of the Virginia-Carolina Chemical Corporation, Richmond, Virginia. During World War II, he was a major in the Chemical Corps of the Army and received a citation for meritorious executive ability and superior technical knowledge as an administrative officer.

Previously, he was a member of the staff of Alabama Experiment station at Auburn.

Grand River chemical plant is located near Pryor, Oklahoma. It is designed to produce 180 tons of ammonia per day which will be used in part to produce urea, the balance shipped as anhydrous ammonia.

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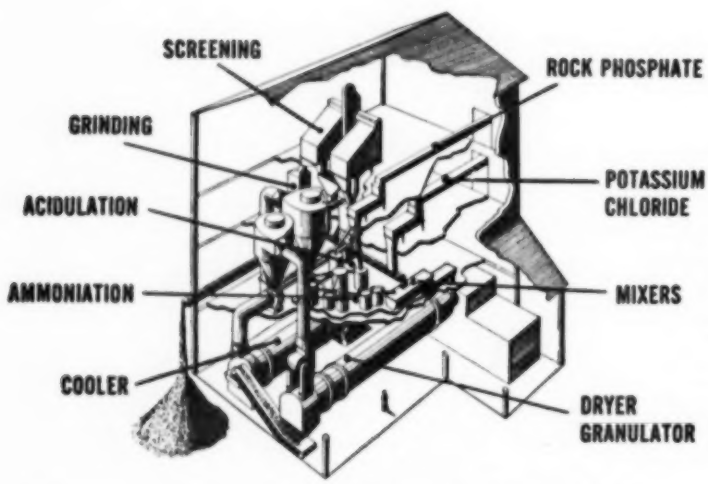

Examples of Formulae Produced by St-Gobain Process

N%	P_2O_5%	K_2O%	
10	10	17	(sulfo-nitric acidulation)
11	11	11	" " "
10	15	20	(phospho-nitric acidulation)
12	15	18	" " "
12	12	20	" " "
14	14	14	" " "
10	20	20	" " "

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AGENTS FOR ST-GOBAIN PROCESS

Thurston Names Smith

W. C. SMITH

W. C. "Chan" Smith has become a member of the staff of Thurston Chemical Co., Joplin, Mo., the company has announced.

Mr. Smith has been employed by the Armour Fertilizer Works for 18 years and gained wide experience by working alternately in the advertising, purchasing and sales departments until 1942, when he enlisted in the Air Force.

Upon discharge as a Captain, Mr. Smith returned to the Armour Fertilizer Works in their Houston, Texas sales office, transferring to their Dallas, Texas office as district sales manager for a large territory. He held this position until June, 1953, when he resigned to go with the Thurston Chemical Company.

•

Davison Elects 5 Directors

Five new directors were elected to the Board of The Davison Chemical Corporation of Baltimore at the regular monthly meeting of the Board on September 24th.

The new directors are: G. L. Hatheway, president and director of the Clifton Conduit Company of Baltimore; Robert B. Hobbs, executive vice-president of First National Bank of Baltimore and director of First National Bank of Baltimore and Provident Savings Bank of Baltimore; W. Griffin Morrel, vice president and director of Chesapeake and Potomac Telephone Co. of Baltimore City and a director of First National Bank of Baltimore, Provident Savings Bank of Baltimore, Maryland Utilities Association and Baltimore Association of Commerce; Frederick L. Schuster, business consultant and agriculturist, who is a director of Automatic Canteen Co. of America, American General Drafting Co., Inc. and Kaneb Pipeline Co.; Charles E. Wilson, chairman of the executive committee of the Board of Directors of W. R. Grace & Co., former president of General Electric Co., former director of the Office of Defense Mobilization and former executive vice-chairman of War Production Board during World War II.

Election of these directors fills the vacancies caused by the resignations of H. W. Goodall, accepted at this meeting, and of B. H. Oehlert, Jr., accepted earlier in the year, and brings the board to its full complement of fifteen members.

•

K. D. Morrison to New Post

Philipp Brothers Chemicals, Inc., New York, have announced the appointment of Kenneth D. Morrison as general manager of their newly-organized Agricultural Division. Philipp Brothers, well known importers and distributors of heavy industrial chemicals for nearly forty years, have decided that because of the current expansion in the fertilizer industry, an entirely independent division would have to be formed to handle this part of their business efficiently.

Mr. Morrison has been associated with the fertilizer industry throughout his entire business career and is well acquainted with all phases of this industry. Early in his career, Mr. Morrison was New York manager of the Potash Division of the International Minerals and Chemical Corporation. Later he was vice-president of the Davison Chemical Corporation, Baltimore, Maryland, as head of the Mixed Fertilizer Division. Subsequent to this, he was president and director of the Naco Fertilizer Company, a wholly-owned subsidiary of W. R. Grace & Co. His latest assignment was a vice-president and director of the Summers Fertilizer Company of Baltimore, Maryland.

Philipp Bros. states that Mr. Morrison's intimate knowledge of the requirements of the fertilizer industry, backed by the national and international contacts of the firm, should help the industry during its expansion.

John Stoddard to Prentiss

JOHN R. STODDARD

John R. Stoddard has been appointed vice-president in charge of sales of insecticides and other agricultural chemicals for Prentiss Drug & Chemical Company, New York, according to an announcement by J. Miller, president of the company. Formerly, Mr. Stoddard was domestic sales manager for John Powell & Co., Inc.

Mr. Stoddard joined Powell in 1940 as a laboratory assistant and was transferred to the sales department in 1945. He was appointed assistant sales manager in 1949 and domestic sales manager in 1951.

Mr. Miller also announced that Frank J. Rush, formerly assistant treasurer for the Powell Company, had joined the Prentiss organization. He had been with Powell since 1945.

•

Connecticut Conference Held

THE SECOND NORTHEASTERN WOOD preservation conference was held at The Connecticut Agricultural Experiment Station, New Haven, September 15 & 16. The conference, composed of scientists, extension workers, and users and suppliers of treated wood and wood preservatives, was formed last year, to develop a coordinated research program and to aid information and education agencies in getting up-to-date facts on wood preservation. Chairman of the conference is C. R. Lockard of the Northeastern Forest Experiment Station, Upper Darby, Pa.

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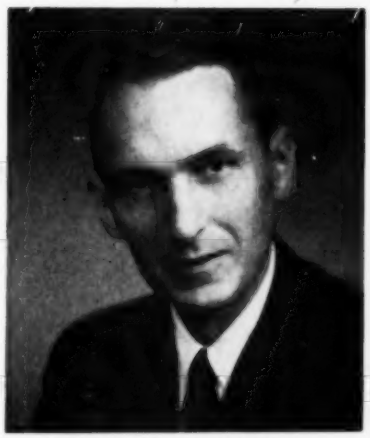
NFA Names Gale and Rucker to New Posts

JOHN F. GALE



DELBERT L. RUCKER

CHANGES in the staff of the National Fertilizer Association have been announced by the Association's Washington office. John F. Gale, member of the NFA staff since 1950, was named editor of the *National Fertilizer Review* and Delbert L. Rucker has been appointed director of information, according to Dr. Russell Coleman, president.

William E. Chace, formerly in charge of these responsibilities, resigned recently to become Washington representative of Group Attitudes Corporation.

Mr. Gale will not only edit the *Review*, but in addition, will edit and assist in the preparation of NFA's educational projects including pamphlets, brochures, motion picture scripts and other media used by the Association in this field. Before joining the NFA, Mr. Gale was manager of the Harrison County Farm Bureau Cooperative, Cadiz, Ohio. He is a graduate of Wittenberg College, Springfield, Ohio.

Mr. Rucker, who was to join the association staff on October 12, will edit the *Fertilizer News*, a biweekly publication. In addition to these responsibilities, he will handle press and radio contacts. He brings a wide background of experience in agricultural public relations to NFA. Prior to accepting his new post, he was associated with the United States Department of Agriculture for nearly 12 years in information, public relations and administrative activities.

He attended Washington State College, Pullman, where he majored in electrical engineering and chemistry. He was reared on a wheat and livestock farm near Pullman in the Palouse country of Eastern Washington.

•

Fulton to Build New Plant

Fulton Bag & Cotton Mills will begin construction shortly on a one million dollar plant at New Orleans, it was announced by Jason M. Elsas, vice-president in charge of Fulton's New Orleans operations.

The building will house complete textile and multiwall pager bag facilities. Mr. Elsas stated that it will be the most modern and completely integrated operation of its kind in the country.

The building will be 296 by 715 feet, containing approximately 212,000 square feet of floor space. Provision is made for future expansion. A rail siding will connect with ten loading and unloading doors. Trucking facilities will consist of a series of bays so designed that trucks will be off the street during loading or unloading.

The firm's general offices, located in the new building, will be modern in all respects, including air-conditioning. Constructed of reinforced concrete and steel, the new plant will rank with the larger manufacturing facilities in the South and will replace Fulton's present operations at another location in New Orleans.

The company, founded in Atlanta in 1870, has operated in New Orleans for 56 years. Home offices are in Atlanta and branches are maintained in St. Louis, Dallas, Kansas City, Minneapolis, Denver, Los Angeles and Savannah. Offices are located in New York and other principal cities.

•

Breck's, Boston, Buys NY Firm

Breck's of Boston, one of the country's oldest seed houses, purchased the Peter Henderson, Stumpp & Walter Co., New York early in October.

The deal is said to be one of the largest mergers in the recent history of the horticultural industry. Combined sales of the two companies is expected to exceed $8 million, according to Luther A. Breck, Jr., president of the Boston firm.

The six retail stores of the Peter Henderson, Stumpp & Walter Co. are located at Millburn, N. J., Farmingdale, L. I., Manhasset, L. I., White Plains, N. Y., Paramus and Newark, N. J. Breck's have two retail stores in the Boston area.

Lawrence Palmeter will continue as general manager of the Henderson firm, assisted by Stuart Block and the present staff. They will work in cooperation with James Shiels, Breck vice-president in charge of horticulture.

•

New B-G Plant in Canada

Barber-Green Co. recently opened their new factory and office facilities near Toronto, Ont., Canada. The firm, with headquarters at Aurora, Ill., manufactures material handling equipment used in fertilizer manufacturing. The Canadian subsidiary will handle both manufacturing and sales in the Dominion.

Diamond Advances Two

Promotion of two executives to vice presidencies and formation of two new autonomous divisions in Diamond Alkali Company have been announced by president Raymond F. Evans following a meeting of the Board of directors.

W. H. McConnell, director of sales, has been elected vice-president—sales. C. E. Lyon, works manager of Diamond's electrochemical plant at Houston, Tex., also becomes a vice-president.

The two new autonomous divisions are the Plastics and Agricultural Chemicals Division with A. L. Geisinger, a vice-president, as general manager of the division; and the Chromium Chemicals Division with Frank W. Jarvis as general manager.

Both Mr. McConnell and Mr. Lyon are natives of Pennsylvania and graduates of Penn State College.

•

Nitrate Strike Reported

A "legal" strike of employees at the plants of Anglo Lautaro Nitrate Corp. at Pedro Valdivia and Maria Elena, Chile, shut down operations on September 7. The employees had previously engaged in an "illegal" strike on August 21, but had not succeeded in stopping production.

Wage adjustments and living cost bonuses ordered by the government already have added about $5 million to Anglo Lautaro's operating costs. This is calculated at the promised but not yet granted rate of exchange of 110 pesos to the dollar. The recent drop in the price of nitrates is expected to mean another decline of around $2 million in income for the company.

•

Hayward to "Udet" Sales Job

C. E. "Chet" Hayward has been named Western Division representative for Universal Detergents, Inc., Long Beach, Calif. The company manufactures "Udet", "Udex" and "Udet F", aryl sodium sulfonates and "Udesolve", a line of four aromatic solvents.

Mr. Howard was connected formerly with the industrial division of Wyandotte Chemical Co. He majored in business administration at San Diego State College and served in the U. S. Navy during World War II.

•

Wyandotte Ups Gerlach

CHARLES F. GERLACH

Charles F. Gerlach has been named general product manager, inorganic and agricultural chemicals, Michigan Alkali Division, Wyandotte Chemicals Corporation, the company reports. In his new post, Mr. Gerlach will be in charge of the marketing of these products. He is also responsible for the coordination of sales plans and programs and liason between manufacturing and sales. He will retain direct responsibility for the sale of agricultural chemicals.

A graduate of the University of Wisconsin, Mr. Gerlach came to Wyandotte in 1951 as manager of the newly created industrial insecticide department, since enlarged to encompass numerous agricultural chemicals. During World War II he served with the Communicable Disease Division of the U. S. Public Health Service and is a member of the U.S.P.H.S. Reserve Officers Association. Other organizations in which Mr. Gerlach is active are the Entomological Society of America, DDT Industry Advisory Committee, the Armed Forces Chemical Association and the NACA.

•

To Market New Pesticide

IPA Chemical Company of Bayonne, N. J., a newcomer in the insecticide field, announced that it has received the U. S. Department of Agriculture registration for its product, "EMEX Vap-O-Cide" for vaporization in its barn model "Super-Modernaire" vaporizer to control flies and mosquitoes.

"EMEX," consisting of ninety-eight per cent Methoxychlor and two per cent inert ingredients, can be used effectively for fumigating purposes in farm buildings, including dairy barns. Preliminary research indicates that various other insects may be controlled in this manner.

Distribution is planned through agricultural chemical distributors. Theodore Riedeburg and Associates, New York, have been retained as sales and marketing consultants.

•

So. Weed Conference Set

Dates for the seventh annual Southern Weed Conference have been announced by Glenn C. Klingman, University of N. Carolina, Raleigh, secretary-treasurer of the group. The meeting will be held at the Peabody Hotel, Memphis, Tenn., January 11, 12 and 13, he says. An equipment and chemical display has been planned as part of the program.

Program chairman is Dr. P. J. Talley, Lion Oil Co., El Dorado, Arkansas. President of the Southern Weed Conference is Dr. W. B. Ennis, Jr. State College, Miss. Dr. W. C. Shaw, Division of Weed Investigations, Bureau of Plant Industry, Beltsville, Md., is vice-president.

Details of the 1954 program will be announced later.

•

Chase Elects Porter in Ohio

Appointment of James F. Porter as manager of the Toledo plant of the Chase Bag Company has been announced. Mr. Porter was formerly in the Engineering Department of the Consolidated Gas & Electric Company in Baltimore, Maryland. Later on he served as Assistant Manager of the Carton Division of the Brooklyn Cooperage Company with a future promotion to plant manager of the Paper Bag Division at Philadelphia.

In his new capacity, Mr. Porter will be the manager of the Chase Bag plant which produces multiwall paper bags.

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November 9 and 10 Meeting Dates for

California Fertilizer Assoc.

PROGRAM plans for the thirtieth annual convention of the California Fertilizer Association have been announced by Sidney H. Bierly, executive secretary of the group. The meeting, scheduled for November 9 and 10, will be held at the LaPlaya Hotel, Carmel, Calif.

Mr. Bierly states that formal industry papers and the annual membership business meeting of the Association will be held on Monday, November 9. All sessions will be at the new Golden Bough Community Playhouse at Carmel. Speakers will include Dr. William A. Albrecht, chairman, Department of Soils, University of Missouri; Dr. Russell Coleman, president, The National Fertilizer Association, Washington, D. C.; Jesse W. Tapp, vice-president, Bank of America, San Francisco; Allen B. Lemmon, chief, California Bureau of Chemistry, Sacramento; and M. E. McCollam, American Potash Institute, San Jose, who is chairman of the California Fertilizer Association's Soil Improvement Committee.

The annual membership meeting will feature the election of three new directors, who will serve for the coming three years; and will consider budgets for administration of the Association and for the Soil Improvement Committee's research and educational program during the coming year.

Tuesday, November 10, will be devoted to recreation, with the annual banquet at Monterey Peninsula Country Club topping off the evening. A feature of the banquet will be the awarding of prizes for golf, bowling and bridge event winners, and other events for the ladies, followed by dancing.

Delegates will be guests of member concerns at three events during the convention. The American Potash and Chemical Corporation is sponsor of a cocktail party to be held at the Monterey County Fair Grounds, Monterey, on November 9, followed by a charcoal broiled steak dinner, auspices of the Shell Chemical Corporation at the Fair Grounds.

SIDNEY H. BIERLY

On November 10, a cocktail party sponsored by Balfour, Guthrie and Company, Ltd., at the Monterey Peninsula Country Club, will precede the banquet. The ladies will be guests of the California Fertilizer Association at a cocktail party, luncheon and fashion show at the LaPlaya Hotel, Carmel, on Monday.

The LaPlaya Hotel, Carmel, is arranging all hotel room reservations, Mr. Bierly said.

•

Bellis Joins Cyanamid

Dr. Maurice P. Bellis has joined the New Products Development Department of American Cyanamid Company. He had been a research chemist at the firm's Stamford Research Laboratories, in Stamford, Connecticut, since 1951.

In his new post, Dr. Bellis will introduce new Cyanamid products to the chemical industry and will be concerned with general development problems within the company. He came to Cyanamid after serving as a Research Associate at Smith College, Northampton, Massachusetts. He received a Master's degree in 1948 and a Ph. D. in Chemistry in 1950, both from the State University of Iowa, and a Bachelor's degree from Cornell University in 1944.

•

Ohio Plans Meeting Series

A series of regional fertilizer meetings were scheduled to be held in four Ohio communities in November, it has been announced. The programs, of similar nature at each locale, will include speakers such as Garth W. Volk, chairman of the Department of Agronomy, Ohio State University; George E. Smith, professor of Soils, University of Missouri, Columbia, Mo.; and W. R. Allstetter, vice-president, National Fertilizer Assn., Washington, D. C.

A representative of the Ohio Banker's Association, O. E. Anderson, the group's secretary, will speak on "The Banker's 'Steak' in Soil Security"; and three members of the Ohio State University Extension Service will appear on the program. These will include Virgil Overholt, agricultural engineer; J. A. Slipher, soil conservationist; and E. P. Reed, extension agronomist.

The first meeting is scheduled to be held in Ottawa, Ohio, on November 2; at Lebanon, Nov. 4; Athens, Nov. 5 and Cambridge, Nov. 6.

In charge of arrangements for the series of meetings are R. E. Baril, Woodville Lime Products Co., Toledo, Ohio, Donald C. Foster, Buckeye Sugar Co., Ottawa; Wilber Kleck, Midwest Plant Food, Inc., Delta; Lewis Kuenzli, Kuenzli Quarries Co., Upper Sandusky; Harry Little, Davison Chemical Co., Ney, Ohio; Fred E. Perry, chairman of the Putnam Country Agronomy Committee, Leipsic; and O. L. Musgrave, County Agricultural Agent, Ottawa.

•

Texas Gulf V-P Retires

Herbert E. Treichler, vice-president of Texas Gulf Sulphur Co. retired recently after more than 35 years' association with the company. During the years of his career, the firm has undertaken tremendous expansion projects in production of its product. Mr. Treichler made his headquarters in Houston.

Ithaca Meeting Planned

Further details of the fifteenth annual New York State Insecticide and Fungicide Conference and the sixth annual Pesticide Application Equipment Conference have been announced by the committee in charge of arrangements. The meeting will be held November 10 to 12 at the Cooperative GLF Exchange's Bibbins Hall on Terrace Hill, Ithaca, N. Y.

The conferences, running as a three-day meeting, are a cooperative presentation among the Cornell Departments of Plant Pathology, Agricultural Engineering and Entomology at Ithaca, and the Divisions of Entomology and Plant Pathology at Geneva, N. Y.

Consideration of application equipment problems will be on the agenda for the opening day, November 10; and on the following two days, the program will be devoted to a review of the highlights on research and recommendations as concerns insecticides and fungicides for New York State.

Members of the staffs at both Ithaca and Geneva are scheduled to appear on the program, complete details of which had not been announced at press time.

Committee members planning the meeting, include O. C. French, Agricultural Engineering; A. Frank Ross and J. M. Hamilton, Plant Pathology; and C. J. Palm and P. J. Chapman, Entomology.

Accomodations in Ithaca may be arranged with the Hotel Ithaca, Hotel Clinton, Plaza Motel or at tourist houses. Limited numbers of accomodations may be handled at Willard Straight Hall and Statler Hall on the Cornell Campus. In all cases, the committee suggests that mention should be made of the Insecticide-Fungicide conference for preferential treatment.

•

Frahm Joins Bag Firm

Arkell & Smiths, multi-wall paper bag manufacturers, have announced the appointment of John O. Frahm to their sales staff, covering the territories of Oklahoma and Northern Texas.

The company also announced two other appointments: Frank Smith, formerly sales representative of the central division at Columbus, Ohio has become southern division sales manager. Roger Seymour, formerly office manager at the Wellsburg, W. Va. Plant, will replace Mr. Smith.

•

Takes Washington Assignment

NORMAN E. HATHAWAY

Norman E. Hathaway, sales manager of the industrial chemicals department of The Davison Chemical Corporation, has been granted a six month's leave of absence by the company to serve as director of the chemicals and rubber division of the chemical, rubber and forest products bureau in the successor agency to the National Production Authority, being organized by the Department of Commerce. The agency has not yet been officially named.

During his absence from Davison, his duties will be assumed by David P. Barrett, assistant sales manager.

•

Moves Office to San Jose

The Western Division of Tobacco By-Products & Chemical Corporation has moved to its new quarters at 1214 Bayshore Highway, San Jose, California, according to E. T. Doyle, manager of the Western Divison. The Division offices have been maintained in San Francisco for the past thirty years.

Warehouse and office facilities have been completed in San Jose and stocks of the firm's "House and Garden" line and the agricultural products will be centralized there. The San Jose warehouse will be used for distribution in eleven western states and Hawaii. Redistribution is handled through warehouses throughout the territory, Mr. Doyle says. Formulation of some "Black Leaf" insecticides will be handled at San Jose.

Mr. Doyle is in charge of the Western Division as manager and K. D. Gillies is assistant manager.

•

"Malathon" Now "Malathion"

The term "malathion" has been registered with the Trade Mark Division and released for general use by American Cyanamid Co., to replace the former word, "malathon" which is a coined name for the insecticidal chemical O,O-dimethyl dithiophosphate of diethyl mercaptosuccinate. Because of difficulty encountered in the trade-marking of the name selected at first, the company, decided to change the name to "malathion". The American Chemical Society and the American Medical Association are agreeable to the change. The Interdepartmental Committee on Pest Control approved the name "malathion" as a coined (generic) name for the chemical in March, 1953.

•

Dec. Cotton Insect Conference

The seventh annual Cotton Insect Control Conference will be held at the Peabody Hotel in Memphis, December 16-18, the National Cotton Council has announced.

Practically all public and private entomologists working on cotton insect control throughout the cotton belt are expected to attend the Council-sponsored conference.

Also present will be a number of farm organization and cotton industry leaders, along with representatives from more than 200 commercial chemical companies, application equipment manufacturers, and commercial applicators. They will report on progress, review current problems, and discuss opportunities for improving the effectiveness of cotton insect control programs.

Nationally-known authorities will cover subjects ranging from new insecticides to refinements in long-standing, proven methods of insect control, the N.C.C. says.

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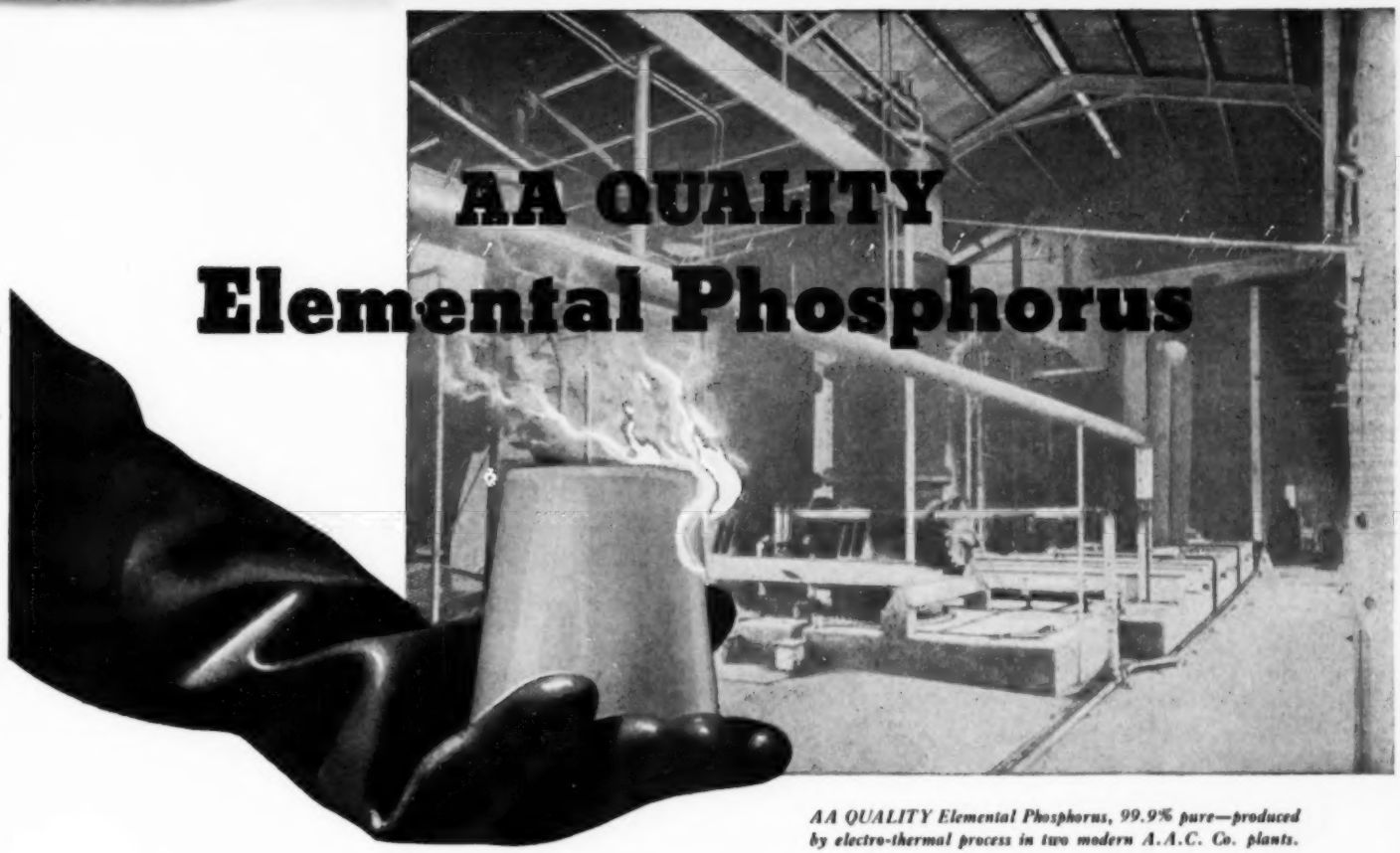

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General Office: 50 Church Street, New York 7, N. Y.
30 factories and offices serving U.S., Canada, Cuba

Results Obtained With Selective Herbicide

CHLORO IPC

METHOD OF ACTION—Through the soil, where its effectiveness depends on absorption by the root system.

FORMULATIONS—May be made as wettable powders or emulsifiable concentrates.

APPLICATION — By ground spraying equipment. Rate for pre-emergence application on cotton: 2 to 3 lbs. per acre on band treatment.

CROPS — Chloro IPC was used successfully in 1952-53 to control weeds in commercial crops of cotton and soybeans. Testing continues on spinach, onions, alfalfa.

RESULTS—Despite a wide variety of soils and climatic conditions, weeds were successfully controlled in cotton and soybean fields. Good results were also obtained in spinach, onions, and other crops. Chloro IPC is effective against annual grasses growing in perennial seed grass crops.

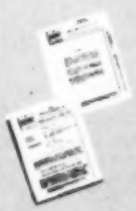
MONSANTO HERBICIDAL CHEMICALS

2,4-D ACID and ESTERS
2,4,5-T ACID and ESTERS
MCP-90 (2-Methyl-4-Chlorophenoxyacetic Acid)
SANTOBRITE® (Sodium Pentachlorophenate, Tech.)
SANTOPHEN® 20 (Pentachlorophenol, Tech.
IPC
CHLORO IPC—Crystals
CHLORO IPC—Liquid 70%

MONSANTO INSECTICIDAL CHEMICALS

SANTOBANE® (DDT)
SANTOCHLOR® (para-Dichlorobenzene)
SANTOPHEN 20 (Pentachlorophenol, Tech.)
HFOS®-T (Tetraethyl Pyrophosphate, Tech. For agricultural use only)
HIRAN® (Parathion. For agricultural use only)

Reg. U. S. Pat. Off.



SEND *for these 2 bulletins on Chloro IPC and MCP-90. They describe characteristics and applications of the products. Write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 800 North Twelfth Boulevard, St. Louis 1, Missouri.*

MONSANTO
CHEMICALS — PLASTICS
SERVING INDUSTRY...WHICH SERVES MANKIND

Hodgson Advanced by Geigy

R. H. HODGSON

Geigy Company, Inc. has announced the advancement of R. H. Hodgson to assistant general sales manager of the Insecticide Division. Mr. Hodgson was assistant Southeast sales manager, having joined the company in April of 1952 as state sales manager of Georgia.

He was graduated from the University of Georgia in 1935 while working as assistant superintendent of the Atlanta Stove Works, Atlanta, Ga. from 1934-40.

Mr. Hodgson was Southeast representative of the Multiwall Bag Division of Union Bag & Paper Corporation from 1940-52 before coming to Geigy Company, Inc.

•

Cyanamid Names Kohlman

CLEM W. KOHLMAN has been appointed advertising manager of the Industrial Chemicals Division of American Cyanamid Company. The appointment became effective September 1st. In his new post, Mr. Kohlman will be in charge of advertising and sales promotion for the six departments in the Industrial Chemicals Division.

White Becomes Division V-P

JACOB WHITE

The appointment of Jacob White as vice-president of Nitrogen Division, Allied Chemical & Dye Corporation, has been announced by the Division. Mr. White has been in the employ of Allied Chemical for 32 years and was previously Assistant secretary of Allied Chemical and assistant to the president of the Nitrogen Division.

Fertilizer Supply Situation Reviewed by U.S.D.A.

By J. N. Lowe

AVAILABLE supplies of major plant nutrients reached a new high during the year ended June 30, 1953. In the main this increased supply was absorbed through consumption channels. The carryover of certain types of material was somewhat higher than a year earlier but is not of burdensome proportions.

The prices of fertilizers during the 1952-53 fiscal year averaged about two percent higher than prevailed in 1951-52. Little changes from present price levels are expected during the coming year.

Preliminary estimates based on current information as to completion of new facilities, and assuming import-export relationships at about current levels, indicate the aggregate supply of the three major plant nutrients available for the 1953-54 season probably will exceed the record output of 1952-53 by around 13 percent.

Nitrogen

THE supply of nitrogen (N) available for fertilizer purposes in 1953-54 is currently extimated to slightly exceed two million tons. This is a preliminary estimate based on current information as to when a number of new synthetic ammonia plants are scheduled to be completed, and assumes about the same import-export balance as in 1952-53. This represents an increase of approximately 11 percent above the reported 1952-53 supply of 1,800 thousand tons.

It is estimated that the supply of solid nitrogen materials (dry nitrogen) available for 1953-54 represents approximately 60 percent of the total supply and solutions and liquid materials (wet nitrogen) represent 40 percent. For the previous year these percentages, based on deliveries, were approximately 62 and 38.

Phosphate

PRELIMINARY estimates indicate that the 1953-54 available supply of phosphatic material, P_2O_5 basis, may exceed the 2,410,000 tons available in 1952-53 by as much as 12 percent. This estimate is based on current information with regard to the completion dates of new plants and assuming that sulfuric acid will continue in free supply.

The new plant capacity scheduled for completion in 1953 involves a sizeable tonnage of concentrated superphosphate, which should increase the supply of this material in relation to the total quantity of P_2O_5 available in 1953-54.

Potash

THE goal established for the expansion of potash (K_2O) production facilities is ahead of schedule.

The 1953-54 supply of potash available for fertilizer purposes will reflect production from these new facilities as well as increases from older operating units. Taking into consideration the possible increase in domestic production, and assuming approximately the same import-export balance as in 1952-53, it is estimated that the 1953-54 supply will exceed the 1,735 thousand tons available in 1952-53 by as much as 15 percent.

New Agricultural Chemicals Helping American Farmers

PARATHION Originally developed by Farbenfabriken Bayer and now manufactured in this country by Chemagro Corporation, parathion is an insecticide of established effectiveness and constantly widening use.

SYSTOX* Common name of active ingredient: demeton. A systemic insecticide, revolutionary in its mode of action. Highly effective against sucking plant pests such as aphids and mites. Used commercially with outstanding success on cotton and in widespread tests on various other crops in 1952. The potential usage and economic importance of SYSTOX appear very large.

NITROX* Common name of active ingredient: methyl parathion. NITROX appears effective against bollweevil, aphids, mites and thrips on cotton. In combination with DDT protection against bollworm and pink bollworm is also indicated. No other insecticide appears to offer protection against so wide a range of cotton insects.

METACIDE* A mixture of parathion and methyl parathion in a special emulsifier which has the property of reducing the skin toxicity of the liquid concentrate. Highly effective against a wide range of insects on many crops.

* REGISTERED TRADEMARK OF CHEMAGRO CORPORATION

CHEMAGRO CORPORATION

250 FIFTH AVENUE, NEW YORK 1, N.Y.

Ross to Geigy Traffic Job

Geigy Company, Inc., 89 Barclay Street, New York, has announced the appointment of Warren R. Ross as traffic manager. He was formerly with Prentiss Drug & Chemical Co.

The Geigy Company originators of DDT insecticides, have developed a nation-wide organization for the manufacture and distribution of agricultural insecticides. More recently, operations have been expanded to include a Pharmaceutical Division with national distribution of several proprietory products.

Mr. Ross, a graduate of the Academy of Advanced Traffic, comes to Geigy after thirteen years' experience as traffic manager. He assumed the position as traffic manager of all Geigy Divisions on August 31, 1953.

•

W. R. Grace Buys NY Bldg.

W. R. Grace & Co. has purchased for partial occupancy, the 24-story New York Cotton Exchange Building located on Hanover Square.

The building's plot area is 12,000 square feet; while the building itself contains nearly 200,000 square feet of rentable area. It is assessed for taxes at $2,975,000. The Cotton Exchange has a long-term lease on approximately 20,000 sq. ft. of space.

W. R. Grace & Co., when possession is obtained shortly, will move subsidiary companies now located in five other buildings in the downtown area to the new premises located opposite the Company's headquarters at 7 Hanover Square.

The Cotton Exchange Building is completely occupied but with the exception of the Exchange, itself, the leases generally are on a statutory basis or expire, with few exceptions, late in 1953 and early in 1954.

•

Berkshire Appointed by "Udet"

Appointment of Berkshire Chemicals, Inc., of New York, as Eastern distributors for agricultural products of Universal Detergents, Inc., has been announced by B. R. Bryant, general manager of the Long Beach, California manufacturer.

"Udet F" surfactants used in fertilizers, insecticides and fungicides will be handled out of the New York office of Berkshire, in the Graybar Bldg., 420 Lexington Ave., through branches in Boston, Cleveland, Chicago and Philadelphia, and warehouses in Baltimore, Tampa and other agricultural centers.

W. L. Gay, vice-president in charge of Berkshire's agricultural chemical department has been named by president M. H. McAllister to direct sales of "Udet F" in the entire area east of the Mississippi.

Monsanto Makes Personnel Changes

A NUMBER of changes in Monsanto Chemical Company's Organic Chemicals Division sales organization have been announced by John L. Hammer Jr., general manager of sales.

Chester W. Christensen, Akron, Ohio; and Arthur P. Kroeger and Cyrus W. Merrell, St. Louis, will become associate general managers of sales — newly created posts.

Tullius C. Tupper of St. Louis, and William M. Russell of New York City, are promoted to the positions of assistant general managers of sales. Mr. Russell will be transferred to St. Louis.

Other changes included the promotions of James A. Singmaster Jr. of New York to New York general branch manager succeeding Mr. Russell. Jack C. Hutchison, Cincinnati, will take over Mr. Singmaster's duties as New York assistant general branch manager. James J. Feeks of New York will succeed Mr. Hutchison as branch manager at Cincinnati.

Mr. Christensen is a native of Akron. He joined the Rubber Service Laboratories in Akron in 1922 as a salesman, immediately upon obtaining a B.S. degree in chemistry from the University of Akron.

Mr. Kroeger is also a native of Akron and holds a B.S. degree in chemistry from the University of Akron (1931). He joined Monsanto in 1929 in the rubber service department at Akron.

Mr. Russell is a native of Glasgow, Scotland, and was reared in Flint, Mich. He joined Monsanto in 1937.

Mr. Singmaster is a native of Palmerton, Pa. He holds an A.B. degree in chemistry from Williams College (1929), and an M.B.A. from Harvard in business administration (1931). Prior to joining Monsanto, New York, in 1944, Mr. Singmaster was general manager at Bainbridge, N. Y., for the Casein Company of America, a division of the Borden Company. He has been assistant general branch manager in New York since 1951.

Mr. Hutchison is a native of Brownsville, Tenn. He received a B.S. degree in chemical engineering from the University of Tennessee (1935) and joined Monsanto in 1941.

Mr. Merrell is a native of St. Louis and attended Cornell University. He joined Monsanto, St. Louis, in 1935 as manager of pharmaceuticals sales, and in 1949 was made assistant general manager of sales.

Mr. Tupper is a native of Texarkana, Ark., and attended Washington University in St. Louis. He joined the heavy chemicals sales group of Monsanto, St. Louis, in 1933. In 1946, after five years of military service, Tupper rejoined the company with his headquarters at Cleveland.

Mr. Feeks is a native of New York and came to Monsanto at New York City in 1934. After four years of military service, Feeks rejoined the company in 1946 and represented Monsanto in the metropolitan New York area.

Mr. Armstrong is a native of Los Angeles. He holds an A.B. degree in chemistry from Princeton University (1942). He joined Monsanto in 1942.

Mr. Evans is a native of Columbus, Ohio, and received a B.S. degree in chemistry from Ohio State University (1941). He has been with Monsanto since 1941.

FOR BETTER PHOSPHATES...
SUPER AND
TRIPLE!

UDET F*

- Speeds up Processing
- Shortens Curing Time
- Prevents Caking

a surfactant especially for...
ACIDULATION

With 55-56 Baume' Sulphuric: Reduce surface tension by adding UDET F to cut-back water; instantly soluble.

With Phosphoric or Nitric: Reduce surface tension by adding UDET F directly to the acid; instantly soluble.

TYPICAL UDET F RESULTS

1) Reaction between acid and rock is instantaneous.
2) Den time reduced by as much as one-half.
3) Reaction speeded up.
4) Percent insolubles reduced as much as .2% to .3% below normal.
5) The super will mill and screen from 60% to 80% faster.
6) The effects of the UDET F in the super carry over uniformly into the manufacture of mixed goods to give faster curing, softer piles and cake-resistant fertilizer.

UDET F IN AMMONIATION AND DRY MIXING

If the phosphates being used have not been acidulated with UDET F, add UDET F to the processing for end result advantages. ½ to ¾ pound conditions one ton of finished fertilizer!

*UDET 90-95F — a powder containing 90-95 percent active
*UDET 50F — a free flowing liquid containing 50 percent active

"ON-SCHEDULE" DELIVERIES

Stocks of UDET 90-95F and UDET 50F are now warehoused nation-wide to insure quick delivery.

Products using UDET F

- Muriate of Potash
- Sulfate of Ammonia
- Borax
- Ammonium Nitrate
- Phosphate
- Superphosphate
- Triplesuperphosphate
- Insecticides
- Mixed Fertilizers

For technical information, delivery and prices, write:

UNIVERSAL DETERGENTS, INC.
P.O. Box 4091 East Long Beach Station
Long Beach, California

Chem. Construction Ups Staples

William M. Staples has been named to the post of manager of construction by Chemical Construction Corporation, which expects to place increasing emphasis on contracts for plants engineered, constructed and placed in operation with its own forces on a "single" contract basis. Formerly, responsibility for construction and initial operation of new plants was handled by Harold E. Broughton, who became a consultant to the firm following his recent retirement.

Mr. Staples joined American Cyanamid Co. in 1938. He was transferred to Chemical Construction Corp. in 1940, where he served as construction superintendent and resident engineer for ten years. He returned to Cyanamid in 1950 as head of the Construction Section of the Central Engineering Department, and two years later was named Assistant Manager of Construction for Chemical Construction.

•

ESA Program Planned

Program plans for the first annual meeting of the new Entomological Society of America are nearing completion, according to Dr. Ernest N. Cory, College Park, Md., secretary. The meeting will be held December 7-10 at the Biltmore Hotel, Los Angeles, Calif.

Dr. Charles E. Palm, head, Department of Entomology, Cornell University, Ithaca, N. Y., president of the ESA, will open the program with his address, followed by a business meeting. The afternoon will be devoted to sectional meetings.

On Tuesday and Wednesday mornings, a special program of invitational papers has been set up. Included on the program are:

Dr. George C. Decker, Illinois Natural History Survey, Urbana, Ill., "The Role of Insects in the Economic Future of Man"; Avery S. Hoyt, chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, D. C., "The Role of Man in the Future of Insects"; and C. P. Clausen, "The Role of the Biological Method in the Future of Insect Control."

Continuing the program, Dr. Roy Hansberry, Shell Chemical Corp., Modesto, Calif., will speak on "The Role of Chemicals in the Future of Insects"; Dr. Robert Glenn will discuss "The Factors Affecting Insect Abundance"; Dr. J. W. McSwain, "Our Present Knowledge of Insect Biology"; and Lea S. Hitchner, executive secretary, National Agricultural Chemicals Association, Washington, D. C., on "The Role of Legislation in the Future of Entomology."

"Developments in the Congress on Insect Nomenclature" will be reported by Dr. Robert L. Usinger; and Dr. H. J. Spieth will speak on "Relation in Drosothilid Mating Behavior to Population Structure."

•

Bemis to Build Plant

Plans for a new paper specialty plant, to be built at Crossett, Arkansas, have been announced by Bemis Bro. Bag Company, St. Louis. The new 20,000 sq. ft. plant will be located on a four acre site in the recently-developed Crossett Industrial addition.

•

Florida Plant Modernizes

The recent installation of automatic fertilizer equipment at Florida East Coast Fertilizer Company's plant, at Homestead, Fla. has made this plant one of the most modern fertilizer plants in the nation. Hand labor operations have been completely replaced.

F. E. C. Fertilizer Company started its modernization program several years ago with the exclusive use of Hough "Pay Loaders" for the mechanical handling of bulk fertilizer materials and the installation of a Davidson-Kennedy mechanical batching machine. This year's modernization included the latest in design of combination screen and hammermill,

(*Turn to Page* 129)

Plant Food Council Presents Awards

—Photo by Louis H. Wilson

Farm magazine writers who most effectively carried the message of soil building to their readers during the past year were honored by the American Plant Food Council, on September 15, at a luncheon for members of the American Agricultural Editors' Association, at the Hotel Washington, Washington, D. C. The principal participants (shown above, left to right) were: Under-Secretary of Agriculture True D. Morse, who made the awards; Jim Roe, Managing Editor, *Successful Farming*, Des Moines, Iowa, winner among the magazines with more than 300,000 circulation and M. C. Gilpin, Editor, *Pennsylvania Farmer*, winning magazine with less than 300,000 circulation. Mr. Gilpin received the award on behalf of the late J. B. R. Dickey, a contributing editor.

Louis H. Wilson, Director of Information and Secretary of the Council presided at the AAEA luncheon and reported that 37 magazines entered in the "Soil Builders Award For Editors" contest represented a paid circulation of more than 15,000,000 readers. He explained that the award would be made annually with scrolls being presented to the winning editors and bronze plaques being given to the winning writers that they designate.

Under-Secretary of Agriculture Morse congratulated the winners for the contributions they had made and are making in the important field of soil building. Assistant Secretaries of Agriculture, who were present for the awards, were: John H. Davis and J. Earle Coke.

Here's

Defoliant NEWS

for the cotton farmer

Thompson-Hayward is pleased to announce a new farm-tested defoliant based on pentachlorophenol plus activating solvents . . . it gets the job done at less than the usual cost! We've named it:

Permagard Defoliant Concentrate

Especially developed for pre-harvest use on cotton. Use one to two quarts per acre, in 4-6 gallons of oil.

Yes, it's another dependable Thompson-Hayward line of farm chemicals . . . in step with the times. Test Permagard Defoliant Concentrate, and you'll recommend it.

AGRICULTURAL THOMPSON-HAYWARD DIVISION

THOMPSON-HAYWARD

Chemical Company

KANSAS CITY, MO. • NEW ORLEANS, LA. • ST. LOUIS • HOUSTON • DALLAS • TULSA
WICHITA • MEMPHIS • CHICAGO • OMAHA • • LUBBOCK • DES MOINES • DENVER
MINNEAPOLIS • OKLAHOMA CITY • N. LITTLE ROCK • SAN ANTONIO • DAVENPORT

Am. Potash Names Steele

Trevor A. Steele has been appointed to the sales staff of American Potash & Chemical Corporation as regional agronomist, the company has announced. Mr. Steele will assume responsibility for the technical sales requirements of potash, agricultural borax and related products in the States of Oregon, Washington, Idaho, Montana and British Columbia. He will maintain headquarters at Salem, Oregon.

Mr. Steele has a wide background of experience in general agronomical problems relating to fertilizers, soil-deficiency materials, weed killers and other agricultural chemicals.

Prior to accepting his new post, he was for seven years regional agronomist for the Civil Aeronautics Authority in the Pacific Northwest. Earlier, for 12 years, he was with the Soil Conservation Service of the U. S. Department of Agriculture in the Pacific Northwest. He is a graduate of Colorado A&M College and attained his master's degree in agronomy at Oregon State College.

•

Buettner, NPCA Head, Dies

William O. Buettner, 55, executive secretary of the National Pest Control Association, New York, died recently in Rutland, Vt. while on a vacation trip.

To Mr. Buettner goes much of the credit for establishment of the present NPCA, he having organized the group under NRA in 1933, as the "National Association of Exterminators and Fumigators" and served as the first president of the organization. He was secretary for a number of years, after which the Association's board appointed him executive secretary.

The late NPCA official was graduated from Dartmouth College in 1924, and at that time took over management responsibilities of his father's pest control business in Brooklyn. During World War II, he served as the industry's consultant with the War Production Board in Washington, D. C., where he advised on the allocation of critical materials.

One of the achievements of his career was establishment of the regional pest control conferences held annually at the University of Purdue; the University of Massachusetts; Louisiana State University; California State Polytechnical College; and the alternating meetings at the University of Montreal and Ontario Agricultural College.

Before the establishment of these conferences, he encouraged professional and business people of the areas to hold seminars for advice on standards, ethics, legislation and other problems.

Mr. Buettner received from Purdue University in January, this year, its distinguished citation for his contribution in raising the standards of the pest control industry during the past twenty years. This award has been given to only four other men in the school's history.

TC
PROVEN QUALITY!
TRI-BASIC COPPER SULPHATE
Tri-Basic Copper Sulphate is a chemically stable copper fungicide containing not less than 53% metallic copper. TRI BASIC Copper Sulphate can be used as a spray or dust on practically all truck crops and citrus crops. Control persistent fungus diseases—correct copper deficiencies from a nutritional standpoint.
TC
TENNESSEE CORPORATION
FUNGICIDES
COP-O-ZINK
Cop-O-Zink is a neutral copper-zinc fungicide containing 42% copper and 11% zinc. COP-O-ZINK gives superior performance in control of fungus diseases. COP-O-ZINK'S composition of two essential elements gives it added value in correcting deficiencies of zinc and copper and in stimulating plant growth. COP-O-ZINK is compatible with all inorganic and organic insecticides. No lime is required. For use in spraying or dusting.
"MICROGEL"
Microgel contains 50% copper as metallic and is chemically stable. Can be used most effectively on all truck crops—also grapes, citrus fruits, melons and strawberries. MICROGEL is simple to use. It can be added directly to spray tanks, saving time and labor.
NU-M
Nu-M contains 41% manganese as metallic and can be used as a nutritional material in either spray or dust form. Nu-M corrects manganese deficiencies.
NU-Z
Nu-Z contains 52% metallic zinc. It is composed of exceedingly fine particles which readily suspend in water for spray purposes. Requires no lime for direct plant application. Correct zinc deficiencies with Nu-Z.
Copper-based fungicides have proven to be the most effective fungicides for control of persistent fungus diseases; including blight. Why take a chance on fungicides less potent than copper? We are basic producers of copper and can furnish copper mixtures to your specifications in large or small quantities. Copper fungicides bearing the TC label . . . mean control at it's best!
TC
MINERAL SALTS
Minerals are just as essential to healthy plant growth and optimum production of vitamin-rich crops as are nitrogen, potash and phosphate. Mineralized fertilizer stimulates sales and creates new business because the results are conclusive. Fertilizers that give superior results are the fertilizers that the growers buy.
As basic producers of minerals, we would like to discuss mineralized fertilizer with you and show you how to increase your fertilizer tonnage and profits by the addition of minerals.
We can supply mineral mixtures to your own specifications in large or small quantities.
• COPPER SULPHATE
• ZINC SULPHATE
• MANGANESE SULPHATE
• MAGNESIUM SULPHATE
• BORON
• FERRIC IRON SULPHATE
For Detailed Information, Phone, Wire or Write . . .
TC
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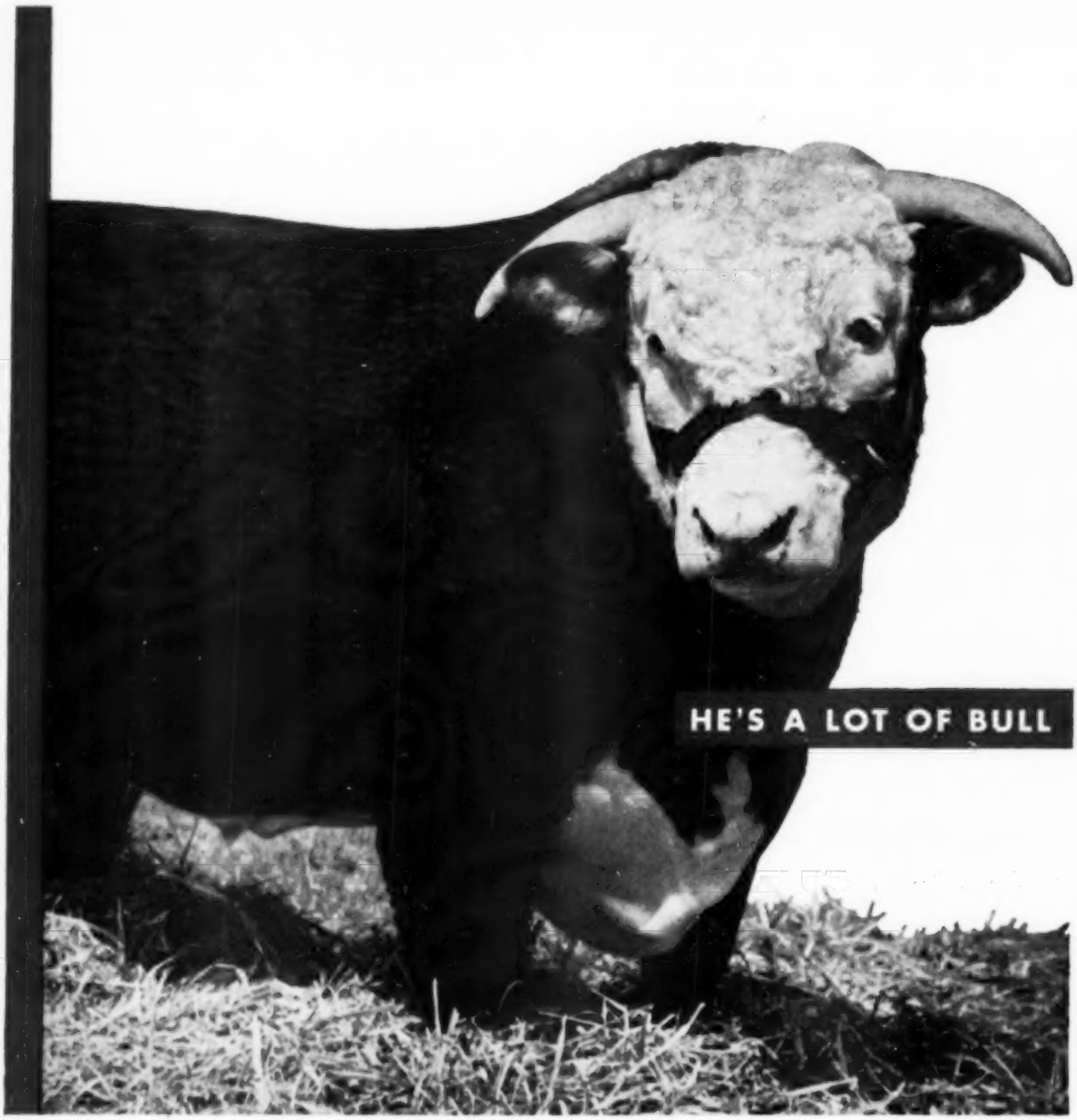
TENNESSEE CORPORATION
617-39 Grant Building, Atlanta, Georgia



SUNSHINE STATE POTASH
PRODUCT OF NEW MEXICO U.S.A.

REG. U. S. PAT. OFF

HIGRADE MURIATE OF POTASH 62/63% K_2O
GRANULAR MURIATE OF POTASH 60% K_2O MIN.
MANURE SALTS 20% K_2O MIN.

He's all beef and more than a yard wide, a healthy, hefty example of prime livestock. The best fodder on the market went into every pound he carries. Prime meat always comes from peak production in the field and rich feed in the silo.

All growth, animal or vegetable, ultimately comes from the soil. Daily the demands of growing crops and thriving livestock drain the land of vital plant-food elements. Fertilizers help restore these elements.

Many of the most effective soil-replenishing fertilizers contain POTASH, often Sunshine State Potash from New Mexico. Potash nourishes the soil and strengthens crop resistance to disease and drought. POTASH is one of the most valuable profit-producing aids farmers and business men can use.

UNITED STATES POTASH COMPANY, Incorporated, 30 Rockefeller Plaza, New York 20, N. Y.

Inter-Association Committee Stresses Publicity

As a starter, the above posters have been prepared to indicate the general idea. The upper right, though slanted toward household pesticides, could be adapted to agricultural use.

A COMMITTEE known as the "Inter-Association Council of Pesticide and Applicator Manufacturers" has been quietly working toward a better correlation of public relations and advertising efforts of the manufacturers of both chemicals and application machinery.

Composed of representatives of the National Agricultural Chemicals Association; the National Sprayer and Duster Association; and the Farm Equipment Institute, the committee has discussed ways and means of improving educational methods for the dealer and the public.

At the recent meeting of NAC at Spring Lake, Eugene E. Perrin, Dow Chemical Co., Midland, Michigan and Howard J. Grady, California Spray-Chemical Corp., Richmond, Calif., representatives of the Association on the committee, reported to the NAC on progress to date.

Mr. Perrin stated that representatives from the advertising departments of the three associations are setting up meetings to determine a starting point on obtaining some degree of unified advertising.

It was suggested that as a modest start, the three groups might agree on a poster or a slogan to make the public conscious of the importance of pesticides and their effective application. The posters pictured here, although not intended to be a final answer to the problems involved, do offer a start in that direction and represent the first effort by member companies to suggest a theme.

"Undoubtedly", Mr. Perrin said, "Future meetings will produce posters and other ideas which may be very acceptable to the member companies of the three associations involved." The next meeting, he said, was to be held in Chicago in October.

(*Turn to Page* 105)

Left – untreated onion; Right – treated with MH-40

Naugatuck nips storage growth in bud!

The United States Rubber Company's Naugatuck Chemical Division has good reason to believe it has dealt a death blow to destructive storage growth. The reason is a new Naugatuck chemical – a water soluble salt containing 40% maleic hydrazide and called MH-40.*

Every grower knows the advantage of storing away part of a crop like onions until the market is more favorable. And every grower also knows the risk involved – namely, the sprouting, shriveling and wrinkling which can make that crop unsalable.

As far back as 1947, Naugatuck's research scientists came up with the first version of MH-40. Since then, working in cooperation with more than 250 experiment stations and other agriculturists, they have discovered hundreds of potential uses for this unique new chemical. One of these uses was for the inhibition of storage growth.

Today MH-40 is commercially available as a grass inhibitor and wild-onion killer. And it won't be long before it will be made available as a storage growth inhibitor, too!

*U. S. Pat. No. 2,614,916

MH-40 is one more example of Naugatuck know-how at work, always striving to introduce new and better products to the agricultural field.

UNITED STATES RUBBER COMPANY Naugatuck Chemical Division, Naugatuck, Conn.

manufacturers of seed protectants – Spergon, Spergon-DDT, Spergon-SL, Spergon-DDT-SL, Phygon Seed Protectant, Phygon Naugets, Phygon-XL-DDT, Thiram Naugets, Thiram 50 Dust – fungicides – Spergon Wettable, Phygon-XL – insecticides – Synklor-48-E, Synklor-50-W – fungicide-insecticides – Spergon Gladiolus Dust, Phygon Rose Dust – miticides – Aramite – growth retardants and herbicides – MH-30, MH-40 – pre-emergence weed killers – Alanap-1.

Haude Named Grace Vice-Pres.

William J. Haude, until recently president of the Pittsburgh Agricultural Chemical Co., has been

WILLIAM J. HAUDE

named vice-president in charge of marketing for Grace Chemical Company, according to an announcement by W. P. Gage, the concern's president.

Mr. Haude was president of Pittsburgh Agricultural Chemical Co. from 1948 to 1953. Before that he was vice-president in charge of sales for John Powell & Company of New York.

In July of this year, Mr. Haude became associated with Inland Chemical Co., Chicago; a firm which was affiliated with Central States Fertilizer Co., also in Chicago. He announces that he will maintain his interest in these businesses although he does not plan to take active part in their operation.

Inland Chemical Co. manufactures and distributes agricultural chemicals in the midwestern states. Central States Fertilizer Co. has plants operating in key locations in northern Illinois and southern Wisconsin at the present time.

Mr. Haude is a graduate of the University of Illinois from which he earned a degree in entomology and agronomy. He also has an M. S. degree from Tulane University. In 1935 Mr. Haude became a research entomologist with the Illinois State Department of Public Health. He joined John Powell & Company in 1936 as a salesman, became salesmanager in 1939, and later vice-president. He will make his headquarters in New York.

•

New Monsanto Office in Del.

Monsanto Chemical Company's Organic Chemicals Division will open a district sales office in Wilmington, Del., about January 1, 1954, according to John L. Hammer Jr., general manager of sales for the division. The office will be located at Governor Printz Boulevard and Edgemoor Road, Wilmington 2.

Daniel J. Murphy, now resident salesman at Milwaukee, Wis., will be manager of the office. Anthony J. A. Bryan, now supervisor of special chemicals in St. Louis, will be assistant district manager.

Mr. Murphy, a native of Chicago, has been with Monsanto since 1940, when he was graduated from Loyola University with a B.S. degree

Stauffer CHEMICAL COMPANY SINCE 1885

CAPTAN 50-W

(FUNGICIDE 406)

THE EXCEPTIONAL NEW ORGANIC FUNGICIDE FOR FRUITS, VEGETABLES, ORNAMENTALS

Captain 50-W has been thoroughly tested on many crops and has proved to be a superior fungicide that gives better disease control, increased yields, improved quality and longer storage life.

IT IS RECOMMENDED FOR:

APPLE: Scab, Brook's Fruit Spot, Sooty Blotch, Fly Speck, Bitter Rot, Fruit Rots.
PEACH: Brown Rot and Peach Scab.
CHERRY: Leaf Spot and Brown Rot.
AVOCADO AND MANGO: Cercospora Spot or Blotch.
CURCURBITS: Angular Leaf Spot, Anthracnose and Downey Mildew.
TOMATO: Early Blight, Anthracnose Leaf Spot, Septoria, Late Blight, Stemphyllium.
POTATO: Early and Late Blight.
CARROT: Septoria and Cercospora Leaf Spot.
ROSE: Black Spot.
CELERY: (Seed Bed): Damping-Off.
SEED TREATMENT: Seed Rots and Damping-Off.
AZALEA CUTTINGS: Damping-Off.

BASED ON GOOD PRELIMINARY TESTS, CAPTAIN 50-W IS RECOMMENDED FOR TRIAL USE ON:

APPLES: Black Rot (Frog Eye)
PEAR: Pear Scab.
PLUMS: Brown Rot.
PRUNES: Brown Rot.
GRAPES: Black Rot and Downey Mildew.
STRAWBERRIES: Fruit Rot, Leaf Spot.
SPINACH: Downey Mildew.
ONIONS: Downey Mildew.

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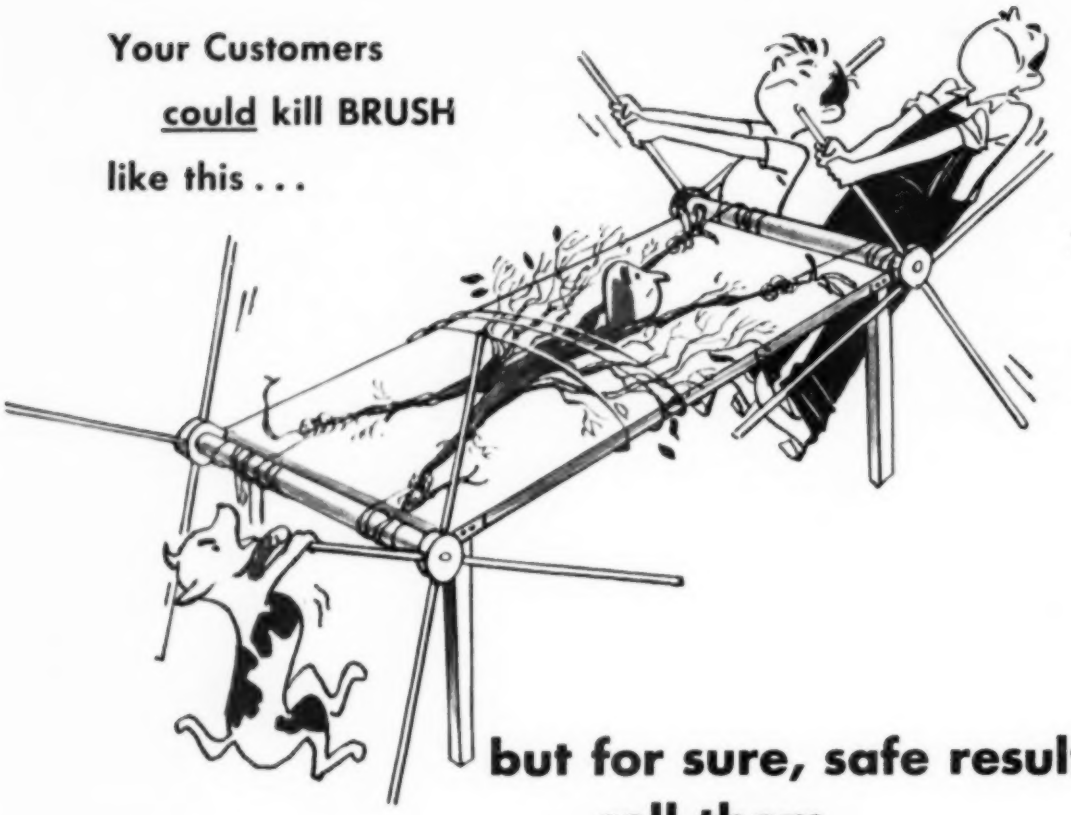

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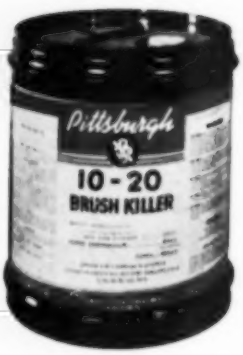

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WEED KILLERS: 2,4-D Acid, 2,4-D Amine Concentrates, 2,4-D Ester Formulated Concentrates, 2,4-D Sodium Salt Monohydrate, D4 (Low Volatile 2,4-D Ester), C4 Pre-Emergence Weed Killer, 2,4,5-T Formulations.
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in chemistry.

Mr. Bryan is a native of Saltillo, Mexico. He received an A.B. degree in languages from Franco Mexicano College in 1940, after which he served in the Royal Canadian Air Force. He received an M.B.A. degree in finance in 1947 from Harvard University and joined Monsanto's Foreign Department the same year. He has been supervising special chemicals sales in St. Louis for the Organic Chemicals Division since June, 1951.

•

M.G.K. Advances J. E. Lee

The appointment of Joseph E. Lee as sales manager—Chemical Division, was recently announced by Paul D. Torpin, vice-president in charge of sales of McLaughlin Gormley King Company, Minneapolis, Minnesota, manufacturers of pyrethrum and allethrin products. Mr. Lee will be located in the company's general offices at Minneapolis.

The new sales manager received his training at Washington and Lee University and Northwestern University, joining M.G.K. in 1948 as a representative of the company in the Chicago district. Prior to his association with M.G.K., Mr. Lee was with Westvaco Chemical Company.

•

Doerr to Empire Post

EMPIRE CHEMICAL AND SUPPLY Company has appointed Howard W. Doerr as head of its Washington, D. C. office. Mr. Doerr will headquarter at Alexandria, Va. He has had broad experience in the field as a former official of the Chemical Section, O.P.S. and of the U.S. Department of Commerce.

APS MEETING

(*Continued from Page 55*)

treated rows to the center of the treated area (0-5 per cent). It is evident that the dissemination of gray mold is so rapid that chemical treatment is not too satisfactory when untreated patches exist in a treated area.

The subject of polyectrolytes as spray conditioners was pursued by J. D. Wilson and J. B. Miller. They reported that the adhesion of a fixed copper (tribasic) to tomato leaves was very substantially increased by the use of various polyelectrolytes, as was the period over which the fungicide remained suspended in water after thorough mixing. Alkaline polymers with high viscosity and high molecular weight gave better adhesion than those of neutral or acid reaction; acid polymers were improved in their adhesive action by neutralizing them with sodium carbonate or ammonium hydroxide.

Alkaline polymers also gave better suspension than those of acid reaction. Interestingly enough, a standard soil conditioner formulation which can be prepared as a 325-mesh powder and mixed and stored with fixed coppers gave as good results as any of the polymers tested. The adhesive and suspending action of these materials on organic fungicides will be investigated during the summer of 1953.

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PHOSPHATE ROCK, INSECTICIDES, and other materials where a uniform, finely ground product is desired.

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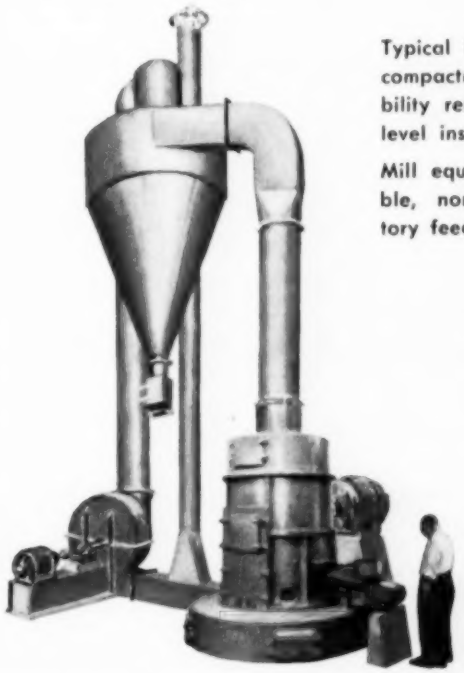

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Read what other Plant Pathologists have to say about Robertson Copper Fungicide, then try it for yourself.

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Robertson Copper Fungicide recommended for control of late blight of potato and tomato, Septoria leaf spot on tomato, Cercospora leaf spot on avocado, Septoria and Cercospora blights on celery. Please use the coupon below to get more information about Robertson Copper Fungicide.

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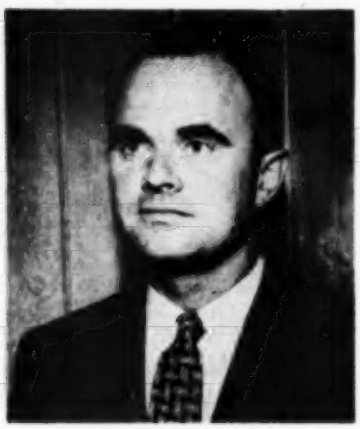
T. M. Ware Named Director

Thomas M. Ware, vice-president in charge of the Engineering Division, International Minerals & Chemical Corporation, has been elected a director of Dunlap and Associates, it has been announced by Dr. Jack W. Dunlap, president of the Stamford, Connecticut, industrial consulting firm.



THOMAS M. WARE

Mr. Ware has served in an engineering capacity in his company since 1952. A graduate of Cornell University, he has been a design engineer for Lockheed Aircraft Corporation, chief engineer of the Radioplane Company of Van Nuys, California, project engineer of the Special Devices Division of the Office of Naval Research, and staff engineer for George Fry & Associates.

•

Mathieson Names Heckman

WILLIAM J. HECKMAN has been appointed director of purchases of Mathieson Chemical Corporation. He will be located at the Mathieson executive offices in Baltimore, and will be in charge of all of the Corporation's purchasing activities.

Before his appointment, Mr. Heckman was vice-president in charge of purchasing and traffic of Aramco Overseas Company, a wholly- owned subsidiary of Arabian American Oil Company, with headquarters at The Hague, and before that was production manager and director of purchases of William R. Warner & Company, Inc., and Richard Hudnut, now Warner-Hudnut, Inc.

Technical BRIEFS

CO_2 Used in Loosening Stored Fertilizer

SOLIDIFIED mixed fertilizers and superphosphates from curing and storage bins have long been a problem in the fertilizer industry. Dynamite blasting not only creates a hazard, but the operation ties up manpower and increases the load on mechanical equipment. A new process for loosening stored fertilizers will be demonstrated during National Safety Congress in Chicago, October 22nd, at the Chicago Heights plant of International Minerals & Chemical Corp., by the Cardox Corp. of Chicago. The method is based on the slow, heaving action of expanding carbon dioxide, released into the packed fertilizer.

The system is safe even in dusty atmospheres. The gas is inert, nonpoisonous, and will not burn or support combustion. The Bureau of Mines has approved Cardox for use under gassy and dusty conditions. Low discharge pressures provide control of overhanging without damaging the structures.

The operation consists of drilling a hole in an almost horizontal plane, about 15° upward, and four to six feet deep in the packed pile. The Cardox tube is then inserted in the hole, and the terminals connected to a battery. When the current flows to the terminals, the chemicals in a heater generate enough heat to gasify the carbon dioxide instantly. Escaping and expanding carbon dioxide breaks up the fertilizer, and tumbles it forward to the loading. The tube may be recovered for recharging and further use.

The manufacturer reports that Cardox expands slowly, and does not reach its maximum volume until all its force has been spent. It is thus found, that even the part of a fertilizer pile which has not actually been dislodged, is expanded and softened, so that it can be removed by loading equipment, without additional shots of Cardox.

Release pressures determine the breaking force of the blow. Optimum results in mixed fertilizers and superphosphates are obtained using a release pressure of 15,000 psi with volumes ranging from 80 to 130 cubic inches of CO_2. *Chemical Engineering* 152-156, Sept. 1953.

•

Organic Phosphate Exposure

The Department of Biochemistry and Nutrition, in cooperation with the Department of Entomology and School of Nutrition of the N. Y. Agricultural Experiment Station, Ithaca, N. Y., has established a diagnostic service to physicans for the protection of farmers and other agricultural workers who may be exposed to organic phosphate insecticides.

Whereas the most obvious and early symptoms of overexposure of humans to organic phosphate insecticides are nausea, diarrhea, and headache, these symptoms are nonspecific and may appear too late to be relied upon as adequate danger signals, or as a basis for proper diagnosis for emergency treatment. More severe poisoning leads to weakness, muscular twitching, pulmonary edema, convulsions, coma, and possibly death if not treated promptly by a physician.

It is therefore essential to know if such symptoms are the result of organic phosphate poisoning, and more important, to prevent their occurrence if possible . . . Determination of the level of enzyme (cholinesterase) activity in the blood appears to be a reliable and specific indication of chronic or acute exposure to organic phosphate insecticides. It therefore provides the basis for a rapid blood test to determine poisoning.

The Department of Biochemistry and Nutrition sends out, on request, a capillary tube in a mailing container for the collection of a blood sample from a finger puncture. Individuals desiring the service are requested to take the tubes to their physician, who collects the blood sample and sends it to the Dept. of Biochemistry and Nutrition for enzyme assay. Less than two hours are required to run the assay after the sample is obtained by the laboratory. H. H. Williams, Ithaca, N. Y., *Farm Research*, page 9, vol. 19, #3, 1953.

•

Soil Phosphorus Test

A new and rapid test for the determination of soil phosphorus has been announced recently by the U.S. Dept. of Agriculture and the Colorado Agricultural Experiment Station, Fort Collins, Colo. The test can be applied to both acid and alkaline soils, and is based on the reactions of calcium phosphates in the soil and the influence of these reactions on plant uptake of phosphorus.

During the past two years, the new test has been used to measure phosphorus fertility in more than 200 soils, ranging from strongly acid to alkaline, and obtained from various sections of the United States. A close correlation was found between the amount of phosphorus taken up by the plant, and the extent by which yields are increased. Field results indicated that most soils showing a level of less than 50 pounds of phosphoric oxide per acre will respond with increased crop yields when phosphates are added. It is reported that generally, no response may be expected if

levels are 50 pounds or more of phosphoric oxide per acre . . . however, this rule may not hold for crops such as potatoes that have a small root-zone feeding area and require a relatively high level of soil phosphorus for maximum yields.

The test was developed by Dr. S. R. Olsen, Dr. C. V. Cole, Frank Watanabe and Dr. L. A. Dean of the Bureau of Plant Industry, Soils and Agricultural Engineering in cooperation with the Colorado Agricultural Experiment Station and the Western Regional Soils Research Committee.

•

Liquid Fertilizer Studies

According to studies at the Rothamsted Experimental Station at Harpenden, England, nutrients applied to the leaves of sugar beet plants are taken up about twice as efficiently as when applied to the soil. It is further reported that nutrient uptake from the soil is affected by uptake through the leaves. Plants sprayed with a solution supplying only nitrogen took up more phosphorus and potassium from the soil than the check plants; similarly, an increased absorption of phosphorus by the roots was found in plants sprayed with solutions supplying potassium but no phosphorus.

•

Magnite Soil Conditioner

A new soil conditioner, Magnite, was announced recently by Western Mines, Inc., Denver, Colo. The product contains nitrogen, phosphorus, potash, sulfur, calcium, magnesia, iron, silica and organics, plus traces of zinc, copper, boron, cobalt, manganese and molybdenum. The minerals used in this product are mined in three western states.

According to the manufacturer, rebuilding the soil, not feeding plants, is the main purpose of the product. However, it is said to have other advantages: it aerates the soil and lowers the soil freezing point by four to ten degrees, thus lessening the chances of winter-kill. The company claims that soil can be treated for about 1¢ per square foot. Magnite is available in 5, 25, 50 and 100 lb. packages.

Outlook on Fly Resistance to Insecticides

IN this second report on the fly resistance problem to insecticides, we have brief notes from Savannah, Ga., and Ithaca, New York; also the following summary of the report by Dr. R. B. March and R. L. Metcalf, University of California, Riverside, Calif., presented at the meeting of the Pacific coast branch of the E.S.A. this past June. We hope to conclude this survey in our next issue with reports from agricultural experiment stations in Washington D. C., and Madison, Wisconsin.

California Insecticide Research

SOUTHERN California, because of its favorable climate which permits nearly year-round breeding of house flies, was one of the first areas in the United States in which this fly developed pronounced insecticide-resistance. In most situations now, wild house-fly populations are so highly resistant to DDT, DDD, methoxychlor, lindane, chlordane, dieldrin and others that their use is impracticable for satisfactory residual control.

Our studies have been directed against many aspects of this problem including studies of the fundamental physiological and biochemical bases of resistance and the development of effective insecticides and their application for field use. A brief summary of some of the results of our more recent investigations and the present outlook for the future are as follows:

Trends concerning the stability of resistance are becoming clearer. Field-collected resistant strains which have been reared in the laboratory without contact with insecticides for four to five years, now show about the same levels of susceptibility to DDT as the non-resistant laboratory strain. Although the majority of individual flies in the strains are susceptible, there still remain a few flies which are highly resistant, and they could form the nucleus for rapid reselection of a highly resistant population. In the field, the picture has been more complicated due to continued selection pressure from substitute insecticides. Last year for the first time we detected general decreases in the average levels of field resistance to DDT, methoxychlor and lindane. These decreases appear to be correlated with the reduction in applications of residual sprays. They are not of sufficient magnitude as yet, however, so that DDT, lindane and methoxychlor would be re-effective. Further observations during this and succeeding fly seasons will be necessary to substantiate this trend. Studies of this nature are enabling us to observe the development of resistance in reverse and they suggest the possibility that we may be able to use these insecticides effectively again, if a rotational or combination control program can be designed which will prevent the development of resistance.

Laboratory studies of the development of resistance by selection of successive generations of house flies with increasing amounts of insecticide have resulted in the development of high levels of resistance with all the compounds investigated so far, except parathion. Over ninety generations have been selected with parathion, resulting in only a five- to 10-fold increase in tolerance. This increase was accomplished in the first 30 generations of selection and has remained relatively constant from that time. Studies of other flies co-inhabiting locations where house flies have developed resistance, have not uncovered any significant resistance to DDT, methoxychlor or lindane in field-collected strains of the false stable fly, *Muscina stabulans* (Fall.); secondary screw-worm, *Callitroga macellaria* (F.); black blow fly, *Phormia regina* (Meig.), and greenbottle fly, *Phaenicia sericate* (Meig.). After selection of a strain of the black blow fly with lindane for over thirty generations, no increase in resistance has been effected. Such studies as these are very encouraging in that they indicate that resistance is characteristic of the insect species rather than the insecticide and that many species may

not have the capability of becoming resistant to certain insecticides. The failure to develop house-fly resistance to parathion may indicate that the organic phosphorus insecticides are a group of compounds against which the house fly is unable to develop high levels of resistance as against DDT.

On the basis of the failures of the past few years, it would appear that the application of residual insecticides for house-fly control has little promise for the future. Since the effectiveness of such treatments, when at their best, is obvious in relation to other types of control measures, our major efforts have been directed toward developing new insecticides for residual fly control. Based on our failures to select a resistant strain with parathion, we have been searching for the past few years for suitable organic phosphorus insecticides exhibiting low toxicity to mammals but satisfactory toxicity to flies and providing at least four weeks' residual effectiveness at practicable field dosages. A number of compounds have been investigated both in the laboratory and field and preliminary results are very encouraging. These compounds, including among others Diazinon[1] and Chlorthion[2] are for the most part of an experimental nature and are not available commercially. However, our investigations during the past few years with malathion[3], which is now registered for fly control, have shown that this insecticide is effective at practicable field dosages of one to two gallons of the fifty per cent emulsifiable concentrate per one hundred gallons of finished spray, but that only ten days to two weeks' residual control can be expected from such treatments. There are indications that the length of residual control can be increased with a bait-type residual spray, by adding one to one and a half pounds of sugar per gallon of finished spray. Dosages, formulations, methods of application, etc. for maximum effectiveness remain to be determined.

Our investigations with synergists for the insecticides against which resistance has developed are being continued. The emphasis in studies with synergists has been shifted from synergists with DDT to synergists with lindane or methoxychlor. This has been done due to the development of resistance in the laboratory to DDT-synergist combinations and to the relatively lower levels of resistance to lindane and methoxychlor in the field. A number of structurally different compounds have been found in the laboratory to be active synergists for lindane or methoxychlor and they are forming the nucleus for further investigation.

The above results are, in general, the most optimistic of all since the inception of this project. This optimism stems from the first signs of a decrease in the general levels of resistance in the field, from the failure of other flies to develop resistance at the same location where house flies became resistant, from the continuing failure to select house-fly resistance to parathion or blow-fly resistance to lindane, and finally from the encouraging laboratory and field results with experimental organic phosphorus compounds and synergists.

Other Resistance Reports

In a note from H. H. Schwardt, Cornell Univ., Ithaca, N. Y. it is reported that two barns sprayed in the summer of 1951 with DDT were effective against flies for a period of six weeks. Mr. Schwardt indicated that no work has been done along these lines this year, but that resistance may have declined somewhat over the past summer.

K. D. Quarteman, Public Health Service, Savannah, Ga., indicates that although routine tests for resistance to DDT were made regularly through 1952, the practice was discontinued at the end of that time, since no reversion in the resistance of the flies was observed.

Mr. Quarterman indicated also that during 1953, some DDT had ben used in combination with other chemicals at dairies in the vicinity of Savannah. The combinations used had shown promise in laboratory tests, but were found to be ineffective in the field. Ths limited evidence indicated no reversion in insecticide resistance in Savannah.

[1]Geigy Company, Inc.
[2]Farbinfabriken Bayer
[3]American Cyanamid Company

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DDT Contamination of Milk

A five per cent oil solution of DDT applied to the backs of cows at intervals of 22 days showed traces of DDT in the milk, two and one-half months after the last application of the spray. The milk contained 2-3 mg per liter in 11-12 days after the first application; after repeated applications, the milk contained 5-6 mg per liter. *Voprosy Pitaniya* 12, #2, 68-73 (1953) *Chem. Abst.*

•

Marine Life as Food Source

The large food resources of the oceans are an undeveloped supply to meet the steadily growing requirements for protein and other protective nutrients of an expanding world population. There is also no question that presently used raw materials of marine origin could be processed with less waste and better preservation of their nutrient value. Greater utilization of fish and fish waste products for agricultural purposes, the improvement of the soil, and the growth of plants and animals are still other applications of marine life not yet fully realized.

Seaweed, in addition to its nutrient content which could be valuable as a feedstuff supplement for animals, is also a natural soil conditioner. The main organic constituent, which is a polymer of d-mannuronic acid, is very similar in both structure and function to the synthetic soil conditioners obtained by hydrolysis of polyacrylonitrile.

A recent discovery in the chemical action of sea algae is the antibiotic action of algal tissues. Plankton is still another marine food source, . . . as a feedstuff supplement for animals. Sponges contain much mineral and organic matter currently being wasted or not all used, which could be converted into potent fertilizer and poultry feed supplements, particularly valuable because of a high organic iodine content.

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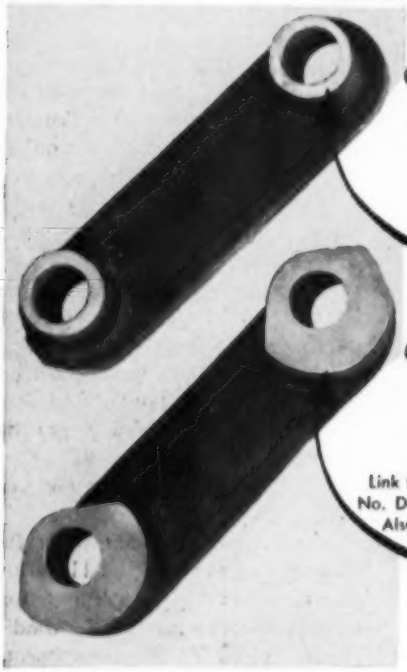

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WHEN YOU CAN BUY BEAUMONT COMBINATION CHAIN THAT GIVES YOU 2½ TO 3 TIMES MORE METAL AT THE POINTS OF GREATEST WEAR?

Link from Beaumont Combination Chain No. DT-102-B. Replaces Standard C-102-B. Also available in DT-111 to replace C-110 and C-111.

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DESIGNERS — MANUFACTURERS — ERECTORS BULK MATERIAL HANDLING SYSTEMS

Fish waste products contain nutrients such as proteins and vitamins that in some instances are of higher food value than the portions utilized.

Despite their impressive extent and their content of nutrient materials, the great bodies of water receive a disproportionate amount of attention as sources of food. F. J. Weiss, Washington, D. C., *J. Agric. & Food Chem.*, pp 822-828, vol. 1, No. 13, 1953.

•

Organics as Insecticides

Tests on 237 organic compounds against at least three species of insects were made at the laboratories of the U.S.D.A., B.E.P.Q., at Anaheim Calif. High kills at low concentrations were obtained with 4-(1,3,3,3,-tetrachloropropyl) cyclohexene and 3-vinylpyridine

1-(2-chloroethyl)-2-(*p*-chlorophenoxy)ethane and trichloromethane phosphonic acid diethyl ester were effective against the army worm, milkweed bug, pea aphid and citrus red mite when used at concentrations of 5 per cent. However, when the concentration of the latter compound was reduced to 1 per cent in tests against the armyworm and the pea aphid, low mortalities resulted. Phosphorus acid diethyl *p*-nitrophenyl ester was the most effective material tested. It caused high mortalities of armyworms and pea aphids when used at concentrations of 0.005 per cent. Ethyl chlorophosphate was effective against the citrus mite when used at a concentration of 0.001 per cent. Compared with citrus mite mortalities resulting from the use of the standard materials, ethyl chlorophosphate was roughly 20 times as effective as Aramite and 2.5 times as effective as parathion. Complete tabulated results on the tests are compiled in U.S.D.A., BEPQ Bulletin #E-863, September 1953.

•

Sweetpotato Storage

DDT dusting of table-stock sweetpotatoes in storage to protect them from damage by the sweetpotato weevil (*Cylas formicarius elegantulus (Sum.)*), has been found successful in the past two years of testing.

In large-scale tests, four dust formulations: 25 (wettable) and 10 per cent DDT and methoxychlor, were applied to approximately 400 bushels of sweetpotatoes by means of a power duster, treating one layer of crates at a time. The first three formulations were found to prevent oviposition by weevils confined on the sweetpotatoes. Their effectiveness in killing adult weevils was in the order named.

Toxic residues of both DDT and methothoxychlor are reduced to a low level by the regular sweetpotato-washing procedure. The average residues in a series of tests from 36 samplings over a 20-week period were: 5 ppm for 25% DDT; 3.8 ppm for 10% DDT; 3.3 ppm for 25% methoxychlor; and 2.1 ppm for 10% methoxychlor. The average residues were in the same order of amount as their toxicity to weevil adults. The residues after washing did not increase with their age on the sweetpotatoes.

DDT contamination of waste wash water may be prevented by adding lime to the waste, which causes flocculation and settling of the DDT and mud present in the water.

This treatment has had a very beneficial effect economically in Louisiana. Over 7,000,000 bushels have been treated in the last four crop years, and during the last two years, many shippers have been dusting all stored sweetpotatoes, even if stored only for a short time. Report by C. H. Gaddis, and E. A. Epps, Jr. U.S.D.A., BEPQ Bulletin #864, September 1953.

PUBLICITY

(*Continued from Page 95*)

Mr. Perrin also pointed out that the cooperation of all other pesticide and applicator groups in the program will be welcomed. "One of the main objectives of getting together is the obvious need for better dealer education and better distribution to make sure that the proper pesticide and the proper application equipment are available at the point of sale and that the dealer is able to instruct the user on purchase and use of proper equipment for equipment for applying the pesticides," he added.

Representatives of the three Associations in attendance at the original meeting included the following: Messrs. Perrin and Grady for the NAC; for the N.S.D.A., C. D. Leiter, F. E. Myers & Bros. Co.; P. L. Hauser, Lowell Manufacturing Co.; and W. Floyd Keepers, of the Association staff. For the Farm Equipment Insitute were K. S. Moltman, A. B. Farquhar Division of Oliver Corp.; Howard Ingerson, John Bean Division, Food Machinery & Chemical Corp., and K. E. Huddleston, of F.E.I.

N. J. CONFERENCE

(*Continued from Page 43*

job adequately is not known and the risk of burning a plant is always present in spraying. Roots, rather than leaves, are the natural means of food intake for a plant, he said. Water intake is a matter of great importance

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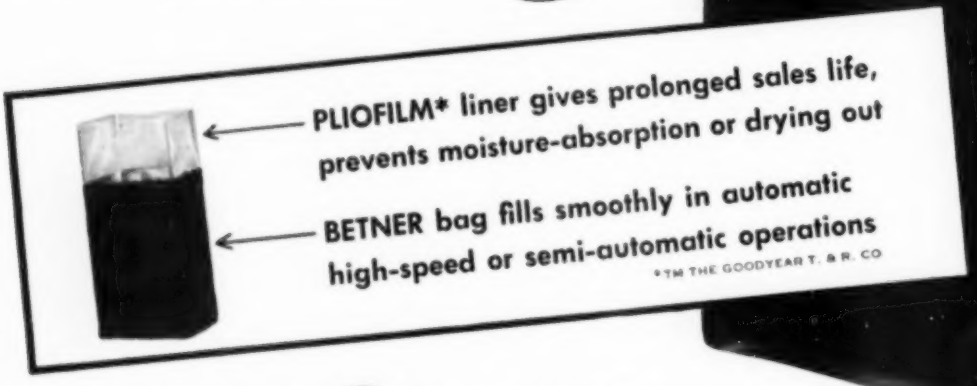
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in plant growth, he reminded.

Greenhouses are well set up for foliar spraying, but the humid atmosphere in glass houses sometimes poses problems.

Mr. Davidson expressed wonder at how airplane application of nutrient sprays on foliage is done without causing burn on the plants. However, combined foliar and soil application of plant food is a growing practice in California and is used rather extensively in New Jersey on ornamentals. But the exact part played by foliar spraying is not known, he concluded.

The annual fertilizer conference is held in the auditorium of Lipman Hall on the College of Agriculture campus in New Brunswick. Attendance was more than 300 at the September meeting.

FUNGICIDE TESTS

(*Continued from Page 59*)

which is capable of producing high percentages of smut on this variety. The seed treatments were applied as slurries, liquids, and dusts at dosages ranging from ½ to 6 oz. per bu. (Table 3). Concentration of slurry and amount of slurry applied to the seed were also varied (Table 3).

For each treatment ½ pound of seed was placed in a two-liter flask, the fungicide was added and the flask was agitated until the seed was well coated. The seed was then placed in paper bags, covered, and allowed to stand for several days after which it was planted in the greenhouse. Each treatment was replicated four times. After one month the seedlings were set out-of doors to accomplish vernalization and then transplanted to the nursery in April. Percentages of smut, based on head counts, were made in August. The results are presented in Table 3.

Of the seven fungicides tested, only two gave adequate control of head smut without reducing stands. These were the volatile mercury compounds "Ceresan M" and "Panogen." There were no significant differences in effectivenes of these two materials, regardless of dosage or methods of application used. At 6 oz. per bu., "Mergamma" and "Vancide 51" also controlled head smut but caused some reduction in stand. They were proportionately less effective at lower dosages, and "Vancide 51" appeared to be more effective in liquid form than as a slurry.

Those materials which did not provide adequate control of head smut at any dosage were "Arasan", "Arasan SF", and "Agrox." In previous tests, "Arasan" has given good control of head smut of grasses and has been recommended for this purpose.

NEW LABORATORY

(*Continued from Page 41*)

precision application of chemicals to plants and soils. Adjoining the corridor is a potting room and storage facilities for soil and equipment.

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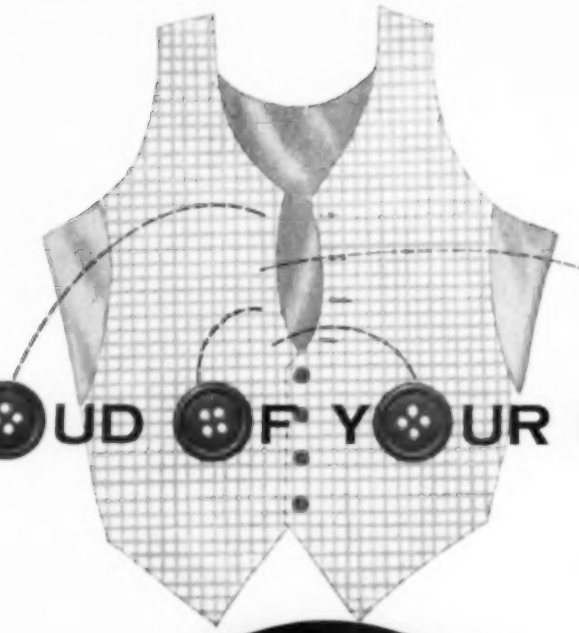

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is divided into four sections and has raised concrete benches which are equipped for sub-irrigation. The second is divided into two sections and has ground beds which have been made deeper than those usually seen to provide adequate depth for testing chemicals on soil. Various soil types are in these beds. Both greenhouses have automatic equipment for opening and closing vents for temperature control. The equipment is regulated by a thermostat so that the vents are opened or closed as needed.

Agricultural chemical research at the Stamford Laboratories is under the direction of Dr. Frank Stark. Mr. M. V. Bailey is the overall Director of Agricultural Chemical Research for American Cyanamid Company.

FUNGICIDES

(*Continued from Page 47*)

mean radii. The amount of chemical required to provide 95 per cent disease control on tomato foliage decreased from 2,200 to 52 p.p.m. and the actual deposit on the leaf surface decreased from 12 to 0.28 micrograms per square centimeter over this range. The intermediate classes gave intermediate results. The large particles had so much material piled up at each locus of deposition that it was used inefficiently. When moderate dosages were applied there were not enough particles to protect the entire surface. When the particles were subdivided, the material was more uniformly dispersed so protection was obtained from a much smaller quantity of chemical.

Some may say this proves that particles should be ground as fine as possible. This was not found to be true. If particles are ground to a mean radius of less than 3 to 5 microns they do not persist very long. There is so much surface exposed to sunlight and other debilitating forces that the deposit loses effectiveness at rapid rate. The most efficient and persistent particles are those ground to a size of 3 to 5μ in radius. These have the minimum surface exposed per unit of disease control. Either larger or smaller particles are a wasteful form of application. This sort of data is considered indispensable for efficient use of organic chemicals.

This does not necessarily mean that every organic fungicide should be ground to a radius of 3 to 5μ. The exact specification will have to be worked out on the basis of the particle's ability to weather satisfactorily. If the materials are photolabile, oxidizable, volatile or soluble, larger particles will be required within the limits of economical application of enough particles to protect all exposed surfaces.

The effect of chemical constitution on persistence of fungicidal deposits is an unexplored field. It is probably not too misleading to allege that we may be trying to exploit the most fungitoxic members of a class when what we should be doing is developing the most stable persistent molecule even though it may be somewhat less active as a fungicide. It should be remembered that the farmer

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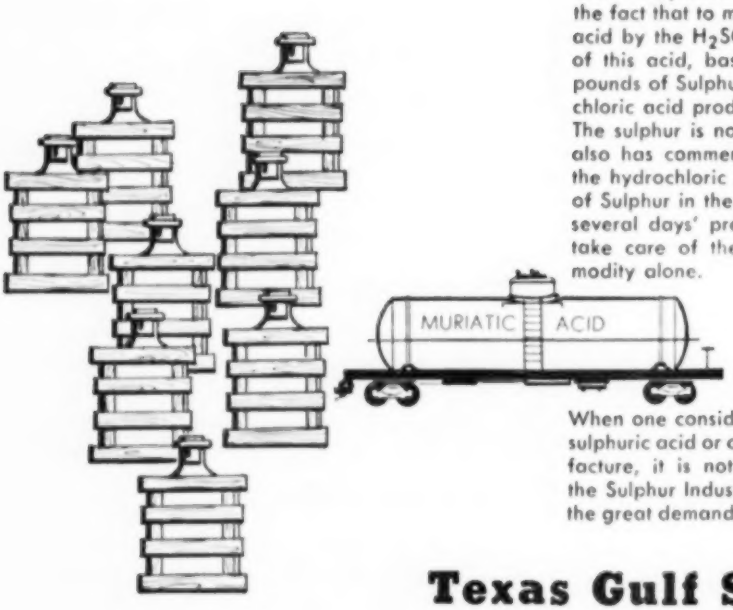

When one considers all the other chemicals that require sulphuric acid or other Sulphur compounds for their manufacture, it is not difficult to appreciate how faithfully the Sulphur Industry is serving industry today in spite of the great demands made upon it.

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is buying protection and nothing else. Too many scientists have jumped to the conclusion that protection will be obtained from the most active of a series. This is not necessarily true because one could sacrifice 20 per cent in fungitoxicity if the material persisted twice as well so the spray deposit would have to be renewed only half as often.

The situation may be clarified by examining some of the information available on the quinones. It has been shown in the benzoquinones that photostability, one of the major requirements of a protective fungicide, increases with substitution. In the series with increasing number of chlorine atoms the quantum efficiencies decrease in the order 0.505, 0.354, 0.256 and 0.095. In other words, stability and fungitoxicity both increase as chlorination is increased so the choice of tetrachlorobenzoquinone for making Spergon was entirely proper even though the manufacturer was more interested in using the member that could be synthesized most easily.

Even so, this quinone is not sufficiently stable to light to be used as a spray material. Its relative 2,3-dichloronaphthoquinone was found to be better as a protective spray treatment. This is because the latter material with its lower oxidation potential has a lower threshold wave length for decomposition. The benzoquinone with a threshold of about 5,770 angstrom units falls in the area of maximum solar radiation which is between 4,000 and 7,000 angstrom units, whereas the naphthoquinone falls below this zone. When basic facts such as these are catalogued and put to use, the scientist can avoid many of the faltering steps that are so expensive in choosing a preferred material for field trial.

Discussion and Summary

The examples cited here are adequate to show that fungicide research is coming of age. It is not easy to pick the right molecule and formulate it so that it will prevent disease establishment. It is even more difficult to write out the specifications so the new molecules can be synthesized for testing. Let us look at the requirements. They are, in order of conception:

(1) The choice of basic nucleus which is relatively inexpensive to synthesize. This nucleus should be chemically reactive in its own right as in the quinones or else be capable of bearing a reactive grouping such as the 4-nitroso group of the pyrazoles.

(2) The toxophore grouping must be exposed so it will react with a vitally important cell substituent such as enzymes.

(3) The toxophore must be protected from excessive detoxification by cell secretions by proper substituents which regulate electron density, etc.

(4) The group must be capable of penetrating the fungus spore. It may be necessary to add a lipoid-solubilizing group as a strategically located substituent.

(5) The lipoid-solubilizing group must be selected carefully so

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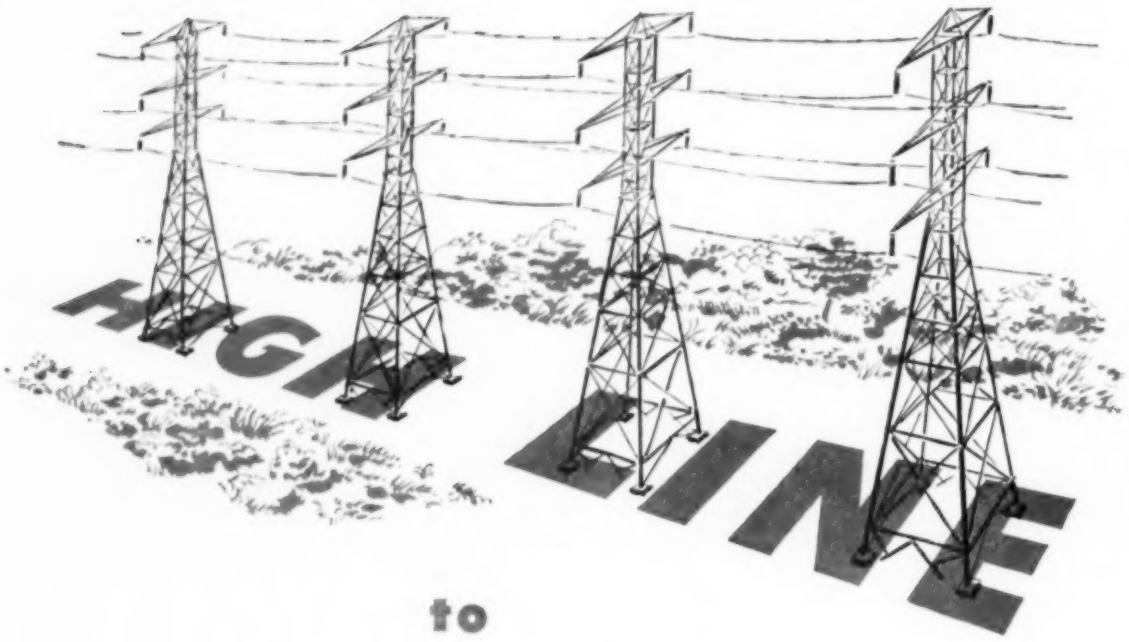

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it will not promote excessive penetration of foliage and fruit.

(6) The molecule must be photostabile, and otherwise persistent through all sorts of weather.

(7) The chemical must be formulated according to its chemical attributes so it may be deposited in an economical and enduring film.

Here is a whole gamut of physical and chemical factors that must be adjusted before the perfect fungicide is ready for extensive field trials. Yet, the very basic principles are not yet known. The great gaps in our knowledge about spores, leaf surfaces and chemical behavior are too great. We have only scratched the surface but we are far enough along to know what data are needed.

The writer is convinced that there should be more, not less, of research funds spent on these basic studies. The stakes are too high—the needs too great—to go on much longer, blindly probing for a better fungicide. The industrial chemist must know what he is trying to create before he can be expected to have inspirational ideas for inventions. Within another decade or two he will have to direct his efforts much more effectively if risk capital is going to be poured into the battle of plant diseases. Surely it would not be too much to ask that two or three per cent of the research funds of the agricultural chemical industry should be diverted to this foresighted and very practical objective. There are places where such work can be done efficiently for the good of the entire industry with that industry's consultation and assistance.

The fundamental knowledge of how fungicides act must be obtained if the industrial research man is to be used efficiently. If such fundamentals are not available and development work continues by empirical testing, the program will eventually become unprofitable as standards of performance in fungicides increase and added expenses such as extensive toxicological research are added to the cost of development. The price of conducting such fundamental research will be paid either in an orderly, planned program or in eventual inefficiency as present methods become outmoded.

It is easy to find a chemical that will inhibit spore germination in the laboratory but it is not so easy to find one that will prevent disease without injuring crops. If it were easy there would be more new fungicides on the market. There is plenty of need for them and the rewards are enticing but industry must plan beyond its immediate future if it is to realize its potentials.★★

NAC ASSN. MEETS

(*Continued from Page 37*)

only as manufacturers and distributors, but also as bankers. This, in turn, indicates a need for fundamental data on various economic phases of the industry with particular reference to trade customs, distribution channels and other characteristics of the agricultural chemical industry. "This data is needed particularly due to the rapid expansion of the in-

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dustry and the great opportunity for future expansion if we proceed on a sound economic basis", he declared.

Five recommendations were made by Mr. Hitchner as a basis for getting the industry into a healthy economic position once more.' These points covered expansion of the publicity and information activities of the Association; assembling data on the importance of pesticides to the grower; a program for the improvement of pesticides and establishment of a set of standards with particular emphasis on physical characteristics, analytical methods, maintenance of quality in storage, etc.

Development of a cooperative promotional program in world markets to publicize American pesticides, was another point brought out by the secretary, and finally, he suggested a study of economic factors pertaining to the industry which would include time of purchase, warehouse and storage customs, credit and other considerations.

Marketing Discussed

TRANSLATING of test-proven scientific data into dollars-and-cents business terms, brings home to the farmer the realization that he can lower his unit cost in the production of various crops, W. R. Allstetter told the NAC group. Mr. Allstetter, vice-president of the National Fertilizer Association, Washington, D. C., showed how the NFA has made great strides in selling fertilizer on this basis. Instead of stressing increased *yields*, emphasis has been placed on the lowered unit cost per bushel, pound or bale; a matter of great importance to a grower in the present price squeeze.

W. R. ALLSTETTER

Mr. Allstetter pointed out that historically, the volume of fertilizer sales has paralleled closely the level of farm income in the U. S. This relationship is under fire at the present time, he said, with the U. S. Department of Agriculture and the Land-Grant Colleges working to end the tendency of sales to follow the upward or downward curves of farm income. NFA has adopted this goal as one of its major objectives, he said, and is working toward this end to the benefit of both farmers and businessmen.

Despite the fact that the fertilizer industry is going through the greatest expansion in its history, to the tune of some $600,000,000 in new capital, the sales potential is still greater than the expanded fertilizer plant capacity. If U. S. farmers were to use the amounts and kinds of plant food recommended by the Agricultural Experiment Stations, demand would exceed the stepped-up supply. Moreover, Mr. Allstetter said, the financial rewards to be realized by individual growers from following recommended practices, are tremendous. The problem is to get the idea across to the farmer who will step up his fertilizer application once he understands the profit to be realized.

The NFA, realizing that thousands of Americans outside the fertilizer industry itself, are also strongly interested in promoting greater use of plant food, is making an effort to work with such groups to make the use of additional quantities of plant food an established part of sound farming. These groups include agricultural college people, county agents, vocational agriculture instructors, banking institutions, chambers of commerce, landlords, and salesmen of many products.

In bringing this message to the farmer, emphasis is laid on the fact that fertilizer alone will not necessarily bring the high yields that cut unit costs and raise profits. In addition to adequate fertilization, the grower must protect his investment with weed control, insect control and other approved practices.

The NFA vice-president then showed on a screen charts developed to show the grower in dollars-and-cents, how the unit cost can be reduced and more money may be real-

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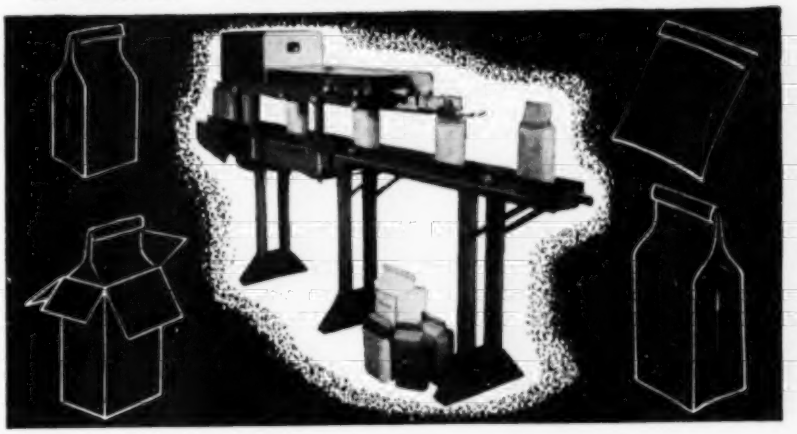

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ized on a given crop. All figures quoted are those from the state college involved, or the state agricultural experiment station so that the local grower will be given facts which fit his locality.

The need for modern trade associations in today's business picture was discussed by Joseph F. Battley, president, National Paint, Varnish and Lacquer Association, Washington, D. C. He commended the NAC on the job it is doing in a difficult field and pointed out the importance of public relations in gaining the objectives of industry.

J. F. BATTLEY

Coke Cites Progress

ASSISTANT Secretary of Agriculture J. Earl Coke, addressing the NAC Wednesday morning, emphasized the importance of research and education in improving agriculture throughout the U. S. "Cooperation between industry and government in agriculture is good", he said. "This is especially true of the agricultural chemicals industry and agencies in the Department and land-grant colleges working for the control of agricultural pests."

He made a plea for more attention to basic research, stating that "all of the really big advances in agriculture have come from basic research, and for that reason, basic research is the most profitable in the long run." Much of this can be accomplished, he said, through industry's "supporting and encouraging" more basic studies through grants to universities. Although a number of firms are doing this, "It would be a good thing for industry and the nation if this could be expanded", he added.

In discussing farm programs, Mr. Coke asserted that no matter what type of program is agreed upon by the people and Congress, it is more likely to succeed if it is based on sound research and vigorous extension and other educational efforts. He reported that in numerous talks with farmers across the land, it has been established that the research and education plase of the program should be strengthened. In strengthening extension work, he said, we believe that special emphasis should be given to closer contacts with individual farmers and working more closely with those in industry who serve agriculture. The best method, he said, is that of personal visits where one may sit down with a farmer and help him to plan operations to take full advantage of all available information.

The assistant Secretary reviewed briefly the development of agricultural chemicals during the past twenty years, and declared that in the years ahead, our greatest concern should be that we have enough foods, fiber and other farm products.

"Every new product that helps reduce the heavy toll of insects, or pushes back the steady advance of weeds or brush that threaten to take over millions of acres of cropland, is a major contribution to the challenge of the next 20 years", he declared. "A population close to 200 millions will make it imperative that we increase efficiency in production and take better care of what we produce." He added that the agricultural industry is a partner with the U.S.D.A. in facing this task.

Panel Discusses Mixtures of Pesticides & Fertilizers

COMPRISED of experts in manufacturing, registration, labeling and entomology, a five-man panel discussed all phases of considerations involved in the mixing of fertilizers and pesticides. The group, under the chairmanship of Dr. L. Gordon Utter, Diamond Alkali Co., Newark, N. J., looked at the question from many angles, then replied to numerous questions from the floor following the preliminary discussion.

Dr. M. D. Farrar, head of the Department of Entomology, Clemson Agricultural College, Clemson, S. C., introduced the subject by outlining the function of soil insecticides in controlling various pests. In order to be successful, however, a chemical

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The book is pocket sized (5 x 7½ x ½ inches), bound with a flexible leatheroid cover, for convenient, practical use. It includes more than 100 tables for practical everyday use. Conversion formulas and examples illustrate application to specific uses.

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must be effective in destroying the parasite without serious injury to the host plant. The matter of host tolerance has been a limiting factor in the use of most chemicals, he pointed out, and out of thousands of promising materials, only a few have survived the tests.

Problems of application of chemicals to the soil are nearly solved with the development of mechanized farming, he recalled, so the major question now is to demonstrate the proper use of the pesticide. To be successful, the chemical must do the job and at the same time, show a profit to the producer. He is not interested in any operation that will not yield a return on his labor and investment.

This leads up to the logical question of whether pesticides should or should not be applied at the same time as fertilizers are put on the soil.

Although pesticides may not perform to maximum efficiency when applied with fertilizers in a narrow band, the volatility of most pesticides enables them to be effective to some extent beyond the narrow strip. Where pesticide-fertilizer mixtures are broadcast and worked into the soil by machines, they are extremely satisfactory, he declared.

The appearance of granular-type pesticides may help to solve some of the application problems, he said. Physically, they handle very much like fertilizers and may be applied either alone or with fertilizers. Both chemically and physically the materials are reasonably compatible, he reported, but a satisfactory procedure for mixing uniformly a small volume of pesticide with a large volume of fertilizer, has not been established as yet.

In summary, Dr. Farrar said that present methods appear to be satisfactory when based on results on the farm. Most producers have been well satisfied with the results obtained following the use of pesticide-fertilizer mixtures. From the standpoint of insuring a uniform product, satisfactory to both the manufacturer and the producer, much work still needs to be done.

A rather dim view of the mixtures was expressed by George T. Harding, general manager, Manufacturing Department, Virginia-Carolina Chemical Co., Richmond, Va.

Although there may be some slight advantages to the farmer, such as lessened danger from handling pesticides with fertilizer as compared to concentrated materials and possibly getting more even distribution in application, he declared that the idea offers no benefit at all to the fertilizer industry.

He asserted that the mixing of these two materials is so different from normal procedure, that few, if any, fertilizer plants are equipped properly to do the work, and that the time cycle required for proper mixing of insecticides with fertilizers would affect seriously the service industry now gives the trade.

That the "greatest storage problem imaginable" would be brought about by the multiplicity of grades that would follow the practice of incorporating odd amounts of pesticidal materials into the number of grades already being offered, was emphasized by the manufacturing expert. "The fact that most of the insecticide materials required are toxic to human beings would present several problems", he added. This would make necessary the addition of sanitary facilities and special supervisory personnel for proper handling of pesticides.

Doubt was cast upon whether or not the average fertilizer plant could meet State requirements on analysis. He reported that even under good conditions where great care, time and strict supervision were practiced, difficulty had been encountered in staying within the tolerances set by the the states. "Even though we knew the weights were correct and the mixtures made as complete as we thought possible with fertilizer equipment, never did we get the full guaranteed analysis from either our laboratory or the State laboratory," he reported.

Other problems involved in mixing center around the introduction of pesticidal materials into fertilizer mixes of 130 to 160 degrees F.,

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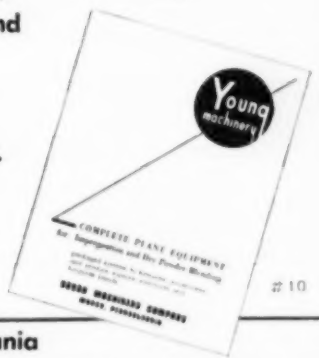

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or higher. To avoid this undesirable practice, "a base of odd analysis is required in each grade, to which the pesticide material must be mixed at time of shipment to comply properly with the guarantee. To make these mixtures as they are called for throughout the day would reduce daily shipping capacity to a point where our customers could not be supplied properly in time for their needs", he said. Thus, the cost of slow intimate mixing would largely eliminate any advantages the farmer might gain by distributing both materials in one operation, Mr. Harding pointed out.

The farmer stands to lose on other grounds, too, Mr. Harding went on. Whereas most popular grades of fertilizer may be applied to a number of crops throughout the entire planting season in several areas, the farmer with several extra bags of fertilizer mixed with pesticide would find himself very limited in when and where he could apply it.

From the fertilizer manufacturer's standpoint, properly handling of mixtures call for a plant designed for such, with proper mixing facilities, safety equipment and shipping machines. It should be separated from the main fertilizer plant to insure that no contamination would occur and that those employees not immediately engaged in this work would not be exposed to the dust and fumes from these materials.

Finally, said Mr. Harding, with such rapid progress in the pesticide field, what assurance does the fertilizer industry have that carried-over goods made up containing varying quantities of insecticides will still be saleable next season? "With this fact always staring us in the face, we cannot afford to mix goods containing these materials except on specific order, with the complete understanding that none can be returned," he concluded.

Eugene P. Ordas, head of the Product Development Division of Velsicol Corporation, Chicago, Ill. pointed out that many reports have been issued describing control of insects, effect on crop yields and the effect upon germination or vitality of plants in connection with fertilizer-pesticide combinations. Still, there are other factors, some obscure and requiring a different approach, which enter the picture. These include persistence of the pesticide in soil; its effect upon the availability of the nutrients; probability of objectionable flavors or crop residues; effect upon soil organisms, etc. To study such problems, the cooperative effort of entomologists, agronomists, micro-biologists, food technologists and chemists is required.

The investigation of crop residues and the persistence of the pesticide in the soil are chemical or biological problems requiring development of accurate analytical techniques. Even with just a single given insecticide, the development of an analytical procedure for soil residues requires almost as many different procedures as there are soil types. Similarly, he pointed out, different analytical techniques must be developed for the analysis of pesticide residues in different crops.

Questions to be answered include that regarding gradual build-up of pesticides in the soil following repeated applications. Will such a build-up reach harmful levels? Also, the economics involved bring up the question of how many years or seasons will the pesticide persist in the soil, effectively, before retreatment is necessary?

Mr. Ordas, like Mr. Harding, pointed out possible difficulties in mixing the two materials. The Velsicol representative explained that low concentrations of pesticides are usually mixed because of the obvious difficulty in getting uniform distribution of such a small proportion of pesticide in a large mass of fertilizer.

"For example", he said, "If the recommended dosage of a pesticide is one pound per acre, to be applied with fertilizer at the rate of 400 pounds per acre, we would need to blend 20 pounds of 10% pesticide dust with 380 pounds of a fertilizer base computed to give desired formula in the finished blend. Since the amount of pesticide dust is only 5% of the total, sufficient time must be allowed during blending

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for practical and uniform distribution of all ingredients. Depending upon the efficiency of the equipment and assuming a ribbon type of blender is used, the blending cycle has been stated to require ten to twenty minutes."

He also discussed some of the factors involved in choice of a carrier to be used for mixtures. Many believe that a granular form of pesticide, of the same average particle size as the fertilizer involved, is ideal. However, Mr. Ordas said, a 30-60 mesh carrier of the fullers earth or Attapulgite type has been used with success. "Still other workers have used effectively a finely-powdered insecticide since it can be more intimately mixed with the fertilizer granules. If a powdered form of the insecticide is used, it is advisable to use a low absorbency type carrier and the insecticide should be applied to the carrier by direct impregnation.

"Comminution of this mixture is recommended to obtain an extremely fine state of sub-division of the particles and a uniform distribution of the pesticide. It is believed by some that a finely-powdered insecticide will adhere to and uniformly coat the fertilizer particles.

"Rigid control of the mixing and blending operation must be maintained and it is most desirable that each lot produced be chemically analyzed to assure the uniform distribution of the insecticide. In this respect a rapid and reliable chemical method for analysis is often the key to successful operation and performance," he said.

Control Official Speaks

JUST how the matter of fertilizer-pesticide mixtures is regarded by State control officials, was outlined by Rodney C. Berry, Virginia State Chemist, and president of the American Association of Economic Poisons Control Officials.

Mr. Berry reminded that since fertilizer materials themselves are not highly toxic, laws regulating the labeling, distribution and responsibility of the manufacturer are not as strict as are pesticide laws. The latter materials are regulated by both federal and state laws, most of which have been amended during the past ten years. Provisions require directions for use and warning against misuse for the most part.

Unlike most regulations governing fertilizers, the pesticide manufacturer is held responsible if his product, when used as directed or in accordance with commonly recognized safe practice, shall be injurious to living man or other vertebrate animal or vegetable to which it is applied, or to the person applying such economic poison, except pests and weeds.

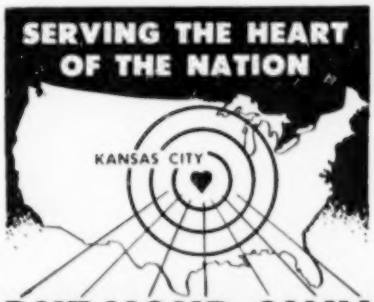
Under Federal law, the pesticide in a mixture, is the active ingredient and the fertilizer is the diluent, or inactive ingredient. Such mixtures passing in interstate commerce must be registered, Mr. Berry said.

He continued by stating that manufacturers of pesticide-fertilizer mixtures will be required to comply with both the fertilizer and pesticide laws in states which have both laws; and in most cases, this includes registration under both laws.

A resolution passed by the Southern Association of Feed and Fertilizer Control Officials was cited to indicate the feeling of this group toward pesticide-fertilizer mixtures. The same resolution was subsequently adopted by the Association of American Fertilizer Control Officials, the Association of Economic Poisons Control Officials and the Association of Presidents of Land Grant Colleges.

Points brought out in the resolution included a recommendation that control officials should not register nor permit the sale or custom mixing of fertilizers containing pesticides for field crop or horticultural use, unless such mixtures have been approved by the State Experiment Station or other state officials. They stated further that the savings in labor costs to the farmer do not warrant risk of contaminating crops or soils by possible misapplication. The resolution indicated further, that mixtures registered for sale must be labeled properly to meet all requirements of both the fertilizer and pesticide laws of the various states.

The viewpoint of another en-



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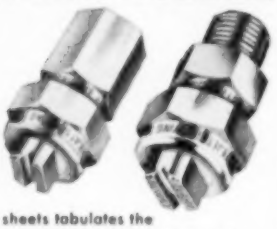

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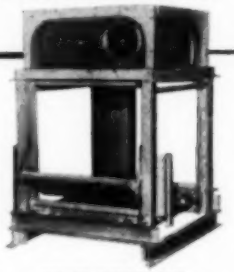

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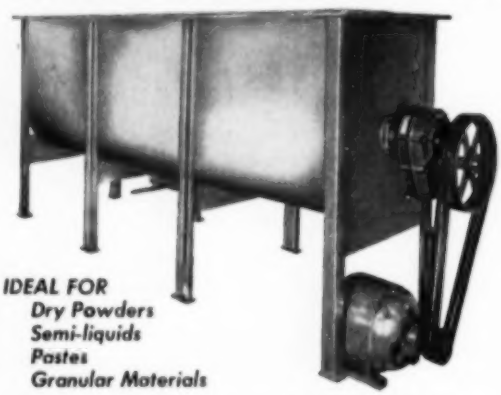

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tomologist were expressed by Dr. C. C. Compton, Julius Hyman Division, Shell Chemical Corp., Denver, Colorado. He discussed the subject of mixture in terms of what the practice means to the entomologist, the farmer, the insecticide manufacturer, the fertilizer manufacturer, the makers of equipment, and the nation at large.

Entomologists, he said, favor the appplication of insecticides in fertilizer, because the method effects a considerable savings in cost. Farmers can utilize the idea because for the most part, they lack adequate equipment to apply pesticides to the soil, but do have machinery for the application of fertilizer, Dr. Compton pointed out.

To the insecticide manufacturer, he said, mixtures offer a new market of great potentialities; and a similiar opportunity exists for the fertilizer manufacturer. The latter, he said, can always compete with conventional insecticide formulations and make a substantial profit.

A question and answer period followed, in which panel members discussed in further detail some of the points made in their original talks.

The annual NAC banquet was held Thursday night at the Monmouth Hotel dining room, with president Mohr in charge. Although no formal speeches were heard, the Association did honor some of its distinguished members with appropriate awards. Lea S. Hitchner was honored for his twenty years of "distinguished and loyal service"; George F. Leonard, W. C. Bennett, and J. Hallam Boyd, were honored upon their retirement from the board.

Final sessions of the meeting were held on Friday morning, with the new president, Paul Mayfield, in charge. Dr. George L. McNew, managing director, Boyce Thompson Institute for Plant Research, Yonkers, N. Y., presented a paper on "Fungicides and Agriculture", emphasizing the need for more materials to control plant disease and pointing out some of the difficulties experienced in finding compounds which will meet all of the many tests. Complete text of his paper is in this issue, page 45.

Richard O. White, Chief, Registration Section, Insecticide Division, U. S. Department of Agriculture, Washington, discussed with the NAC group "Some Problems Relating to the Registration of Economic Poisons." One of the functions of the Federal Act of 1947, he explained, is to protect the public through sound labeling requirements. Full information as to its usefulness and limitations must be established before a product may be labeled adequately, and the securing of such information is one of greatest problems in the registration program, he said. Much of it must come from industry, with the agency asking the questions and the industry bearing the brunt of furnishing satisfactory answers.

Final paper of the meeting was presented by George P. Larrick, Deputy Commissioner, Food and Drug Administration, Washington, D. C. He pointed out first, the numerous areas of agreement between the industry and the F.D.A. "We both know that pesticides are not only important, but are essential to the continued production of abundant food crops," he said. "There is every reason to believe that the need for more effective pesticides will continue to increase."

In covering the question of whether pesticides should be placed in the same category with other chemical "additives" on food, Mr. Larrick declared that "We have become convinced that separate treatment is justified for pesticides as distinguished from other types of chemical food additives." He pointed out that chemical additives generally are not subject to control under the Federal Act, but pesticides are. "Obviously", he said, "The two Acts should be coordinated. The relationship and the differences in function between pesticides and other chemicals used in food production point to separate legislative treatment of pesticides."

He urged that scientific questions be settled by scientific people, and suggested that the pesticide industry should have a small, competent staff in the Food and Drug Administration to deal with applications for tolerances for pesticides.★★

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Rates for classified advertisements are ten cents per word, $2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, $1.00 minimum. Address all replies to Classified Advertisements with Box Number, care of AGRICULTURAL CHEMICALS, 175 Fifth Ave., New York 10. Closing date: 25th of preceding month.

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EXPORT STAFF ASSISTANT wanted. Man between 25 and 35. Require a competent sales correspondent and assistant to the export manager, Agricultural Chemical Division. Must have past background in the export sale of agricultural chemicals. Knowledge of Spanish essential. Location New York. Send complete information to Box No. 790, c/o **Agricultural Chemicals.**

WEED SPECIALIST: Agronomist preferred. 25-30 years old. For economic research and promotion of herbicides. State salary expected. Address Box 789, c/o **Agricultural Chemicals.**

SELLING AGENTS: Fertilizers, Chemicals. European shippers want well-introduced selling agents in U.S.A. Address Box No. 791, c/o **Agricultural Chemicals.**

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and
Manufacturers' Representatives
on
Agricultural Chemicals

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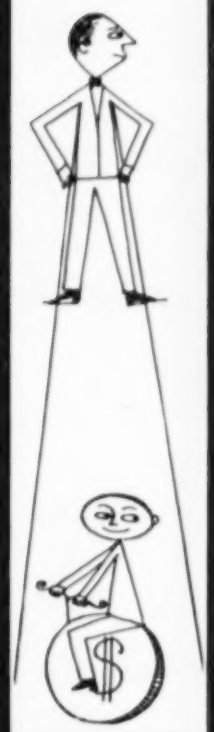

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FLORIDA FIELD TRIALS
Evaluations
of
Agricultural Chemicals.
DR. G. R. TOWNSEND
Box 356
Belle Glade, Florida

FLORIDA PLANT

(*Continued from Page 91*)

a 2000 pound mixer and a completely automatic Inglett & Corley bag filling machine.

Additional modern features are the use of flow meter ammoniation system and a high speed "slinger" for filling bins. Car unloading has been stepped up by the use of an electric "car spotter" and storage space of materials has been increased by structural changes in the building.

This year's improvements provided in their designs for the future possibilities of the sale of bulk fertilizer.

All changes at F.E.C. have been made with the view of increased service to farmers in the area served by the company. "New equipment makes it possible to make fertilizer faster, more accurately and maintain price in the face of greatly increased costs," the company says.

Henry Pridgen, manager, has extended a cordial invitation to any group or individual, having an interest in the manufacturing of fertilizer, to visit the plant. Groups desiring informal discussions on fertilizer principles are invited to contact the company.

•

ALVIN J. COX, Ph.D.
Chemical Engineer and Chemist
(Formerly Director of Science, Government of the Philippine Islands. Retired Chief, Bureau of Chemistry, State of California, Department of Agriculture.)
ADVISER ON AGRICULTURAL CHEMICAL PROBLEMS AND INVESTIGATIONS
Consultant in reference to spray injury and damage, claims, including imports of fruits and nuts, formulas, labeling, advertising and compliance with law.
1118 Emerson Street
Palo Alto, California

Proportioning System Bulletin

A new six-page bulletin, offered by Richardson Scale Co., Clifton, N. J., pictures and describes the company's recently-developed proportioning and materials handling system for automatically making up formulated mixes of bulk products.

Called "Select-O-Weigh," the system uses a single automatic scale to weigh different products cumulatively. The amount of each product fed to the scale is preset by an operator at a remote control panel. Materials handled include fertilizers, chemicals, and other formulated products.

The bulletin explains the operation of the electronic control system, discusses rates, accuracies and goes into the possibilities of remote recording.

Also explained is the actual formulating operation, the selecting, feeding, weighing and mixing. The bulletin includes a large schematic drawing of a typical "Select-O-Weigh" system, showing the arrangement of bins, feeders, bulk scale and batch mixers. Photos show a "Select-O-Weigh" control panel and an automatic scale set up for use with the system. For copies of bulletin (#0351), write to Richardson Scale Co., Van Houten Ave., Clifton, New Jersey.

•

Summers Names Wallace

J. E. Totman, president of Summers Fertilizer Company, Inc. of Baltimore, Maryland, has announced the appointment of C. M. Wallace as manager of bulk sales and exports. In recent years, Mr. Wallace, as an independent agent, has been marketing fertilizer in both the foreign and domestic fields. For many years prior, he was sales and export manager for the former Standard Wholesale Phosphate & Acid Works, Inc., Baltimore, Md. Mr. Wallace is well known to the trade both in the U. S. and abroad.

•

IMC Reports Earnings

Net earnings of International Minerals & Chemical Corporation for the fiscal year ended June 30, 1953, increased nearly 6 per cent to $7,030,176 from $6,653,251 for the previous year, according to the Corporation's 44th annual report. Net sales for the year ended June 30, 1953, amounted to $88,837,456, an increase of 5 per cent over sales of $84,570,447 in the preceding year.

Earnings were equivalent to $2.87 per common share on the 2,316,164 shares outstanding at the year end. This compared with $2.90 per share on the 2,161,511 shares outstanding a year earlier, the company reports.

PIONEER PYROPHYLLITE PRODUCERS . . now offer

"PHYLLITE" (Trade name) **And** **"STONE MEAL"** (Trade name)

World's greatest diluent and carrier is non-abrasive, uniform and adheres readily to foliage. It is ground in a Raymond mill — 95% through 325 mesh and has a low pH of 5.1. Phyllite is packed in 50 pound valve bags, 20 ton lots lowest prices on the west coast, fob plant.

16% organic potash with trace minerals. Immediately available in bulk or sacks. Write us for helpful information and a generous sample. Expansion of new Campo, Calif. plant will increase our production to 300 tons a day.

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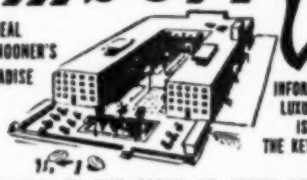

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- 400 feet of Private Beach
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Please send me your FREE brochure and full details about LOW COST Spring and Summer vacations.

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POWDERED TALC

An excellent carrier for insecticides and fungicides. Produced by

Cohutta Talc Co.

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1952

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Industry Publications, Inc.

175 FIFTH AVENUE NEW YORK CITY

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Tale Ends

ENTOMOLOGISTS can once more hold up their heads with pride, like Calvert men of distinction, for the man of the hour, Dr. Alfred C. Kinsey, it turns out, was originally an entomologist. He went to Indiana University about thrity-five years ago as assistant professor of zoology where he was first engaged in taxonomic studies on the gall wasp. He decided at an early date that "the taxonomic approach could be transferred from the study of insects to the study of human beings" and for the past twenty-five years has been occupied with the sex studies which have now made him famous.

* * * *

Lee Kolker is back in the chemical manufacturing business again. His new concern, Kolker Chemical Corp., will produce tricresyl phosphate, chloroform and methylene chloride. This is the third company Mr. Kolker has fathered. His first venture, Elko Chemical Co., Pittstown, N. J., manufacturers of DDT, was sold to Pennsalt in 1945. Then Kolker Chemical Works, Newark, N. J., and Houston, Tex., which he organized and operated successfully for several years, was sold in 1951 to Diamond Alkali, and has now become Diamond's organic chemicals division. The latest Kolker enterprise, in which Charles Kolker will be associated once more with brother Lee, will be noncompetitive with the line of agricultural chemicals produced and marketed by Diamond.

* * * *

Calspray has rung the bell this past fly season with a new type fly killer which has met with wide acceptance for use around dairy barns, stables, etc. Based on two toxicants, lindane and TEPP, it is designed to be mixed with syrup or molasses, then sprayed on a gunny sack or other such material. The sweet ingredient attracts the flies, and the rather high percentage of toxicants is reported to have been very successful, this year at least, in registering high kills on flies of all strains, resistant or otherwise. The problem of formulation is reported to be a rather tricky one.

* * * *

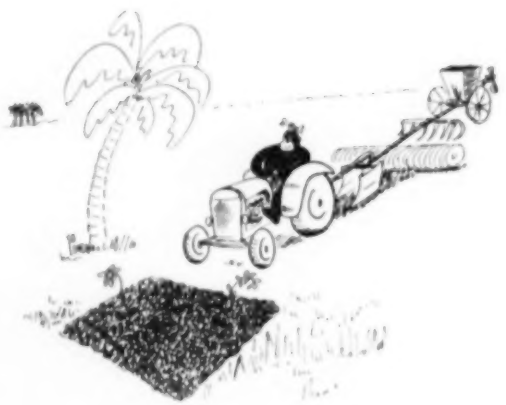
While on the subject of resistance, we might pause to recall a recent advertisement which offered fly swatters "guaranteed effective even against resistant flies."

* * * *

The late issue of the Virginia-Carolina News devotes three pages of space to honor George F. Leonard, former NAC president, who recently retired as executive vice-president, Tobacco By-Products & Chemical Corp. (V-C subsidiary) after 38 years.

The third page of the article is a tribute to Grub from the NAC Association itself. It pictures him in his rose garden in Richmond, with Lea S. Hitchner and Jack Vernon, and also shows Grub taking it easy in a chair reading a copy of Agricultural Chemicals.

Cultivation . . . *



*So it's the wrong time of year to cultivate. But remember, things are different where Cuthbert is!

EXPERIENCE proves that sales ground well prepared by advertising pays off best. But if it be specialized markets which you do and can sell, why buy large, general circulations with their high cost and inevitable waste? Specialized publications in their own fields usually can do a better job at lower cost, just like the job which can be done for you in the field of chemicals for use in agriculture, by

AGRICULTURAL CHEMICALS

175 FIFTH AVE. NEW YORK 10, N. Y.

Member Audit Bureau of Circulations

Bemis dress print cotton fertilizer bags...

"the extra that pushes a sale ~~our~~ *your* way!"

Read this statement from Mr. Hugh Latimer, vice-president of the Supreme Feed & Fertilizer Co., of Philadelphia, Miss. It really tells the whole story . . . shows why YOU will benefit by packing YOUR fertilizer in Bemis Cotton Bags.

"We have noticed that an attractive Bemis Dress Print Bag can often be the extra that pushes a sale our way. In most farm families, that piece of goods is a bargain that makes them happy and keeps them friendly."

Hugh Latimer

Hugh Latimer, Vice-President
Supreme Feed & Fertilizer Company

One of the good customers of Supreme Fertilizer is Mr. W. A. Kemp. He has bought many tons of it in Bemis Cotton Bags.

Bemis

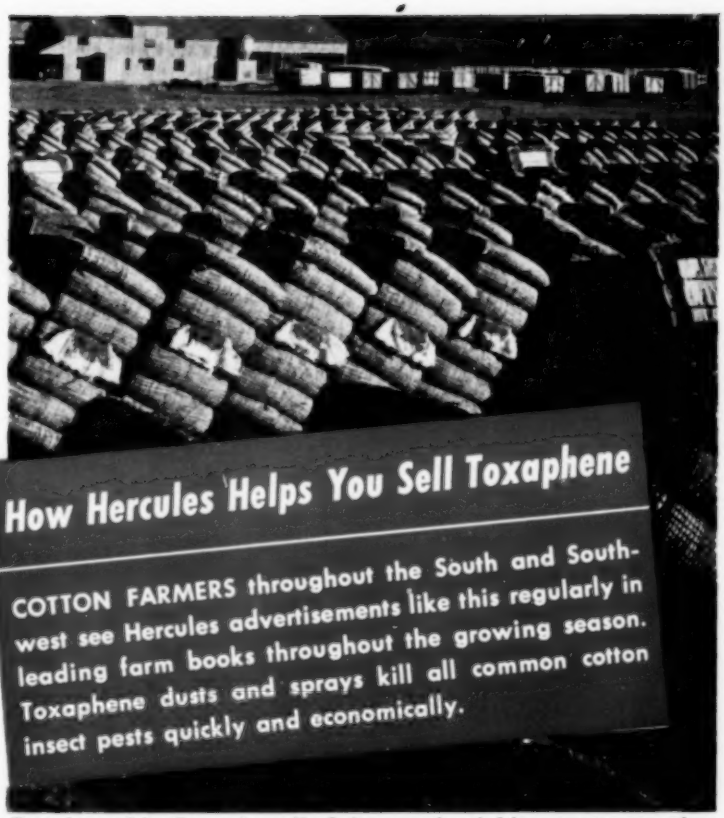
General Offices — St. Louis 2, Mo.
Sales Offices in Principal Cities

THIS IS THE PAY-OFF FOR INSECT PEST CONTROL

Toxaphene Insecticides Give Thorough Protection at Low Cost

How much cotton will you lose to bugs this year? It depends largely on what you've already done about insect pest control, and what you *continue to do* until picking time. There's still plenty of opportunity for harmful insects to get into fields and eat up your profits. Tests in state after state show that toxaphene-treated cotton produces bigger yields. Protect *your* crop with toxaphene dusts or sprays.

Toxaphene kills cotton insect pests *fast!* For example, of more than 350 commercial cotton poisons examined in the laboratory at Clemson College, toxaphene formulations killed more boll weevils—and killed them faster—than other insecticides tested at equivalent dosages. Toxaphene is fast! It is long-lasting! Toxaphene is the most economical all-round cotton poison you can buy!


How Hercules Helps You Sell Toxaphene
COTTON FARMERS throughout the South and Southwest see Hercules advertisements like this regularly in leading farm books throughout the growing season. Toxaphene dusts and sprays kill all common cotton insect pests quickly and economically.

This is the pay-off that all cotton farmers like. Such scenes at the end of the season are common where insect pest control has been carried out with low-cost toxaphene dusts or sprays. For more cotton per acre, apply toxaphene regularly.

Healthy cotton like this is largely the result of applying toxaphene dusts or sprays. Toxaphene used during early stages and maximum fruiting helped produce this yield.

There's no profit in cotton like this. It's what can happen when insect control measures are neglected. Protect your fields with toxaphene dusts or sprays.

TOXAPHENE dusts · sprays

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